COMPACT DISC PLAYER

DP-7050

SERVICE MANUAL

KENWOOD

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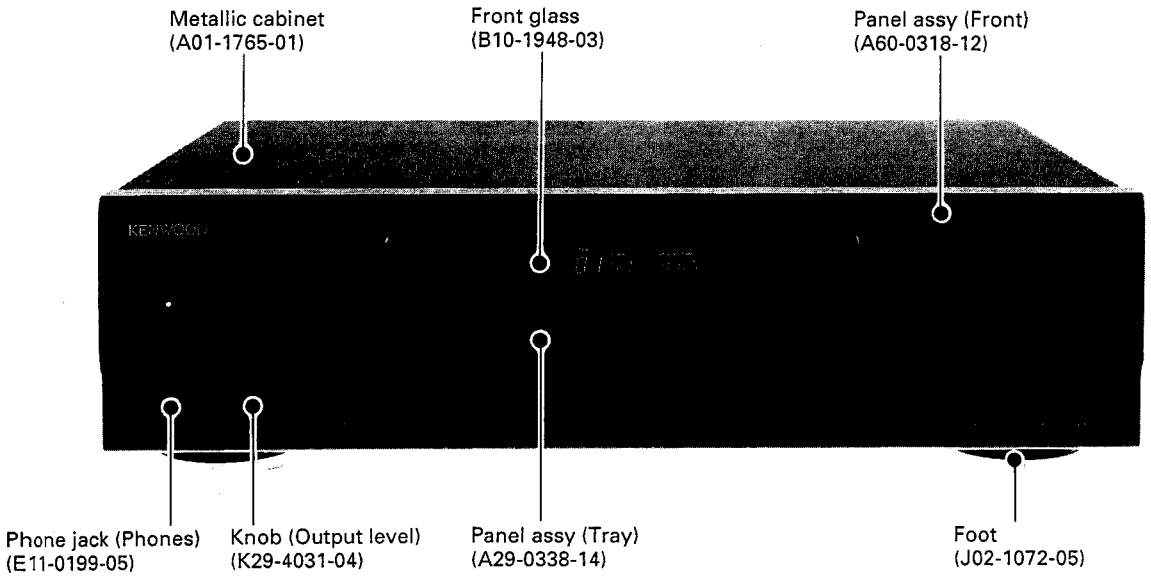
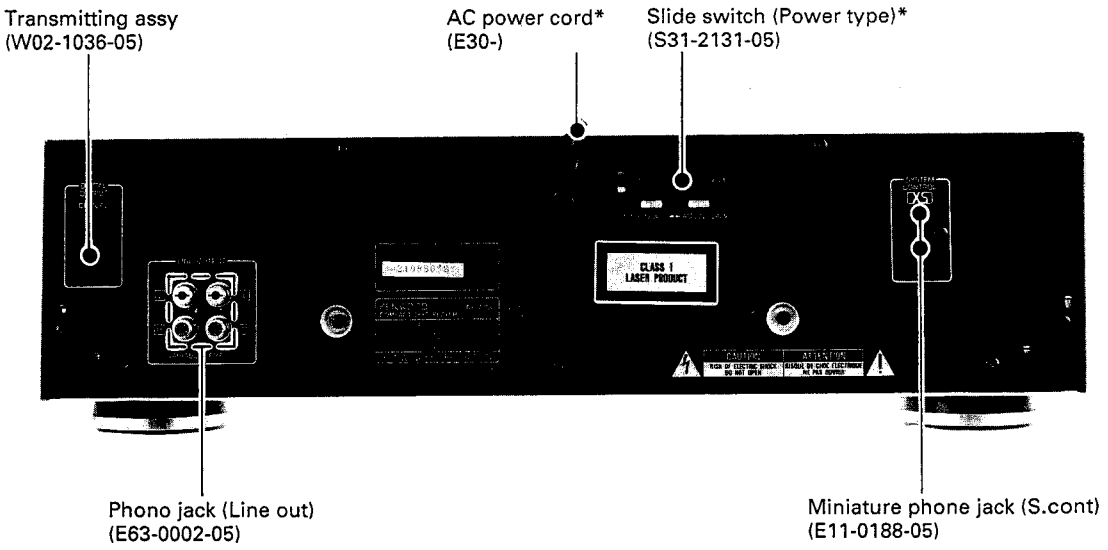
B51-4644-00(O)2272





In complicance with Federal Regulations, following are reproductions of labels on, or inside the product relating to laser product safety.

KENWOOD-Corp. certifies this equipment conforms to DHHS Regulations No. 21 CFR 1040. 10, Chapter 1, Subchapter J.

DANGER : Laser radiation when open and interlock defeated. AVOID DIRECT EXPOSURE TO BEAM.

***Refer to parts list on page 51 .**

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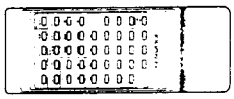
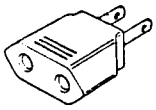
ACCESSORIES

- Remote control unit 1 (A70-0921-05)
- Battery cover (A09-0078-08)



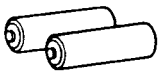
- AC plug adaptor 1 (E03-0115-05)



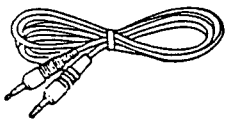
(M type only.)
For the unit with European AC plug in areas other than Europe.

- Audio cord 1 (E30-0505-05)

- Batteries ..... 2 (–)



- System control cord 1 (E30-0977-05)

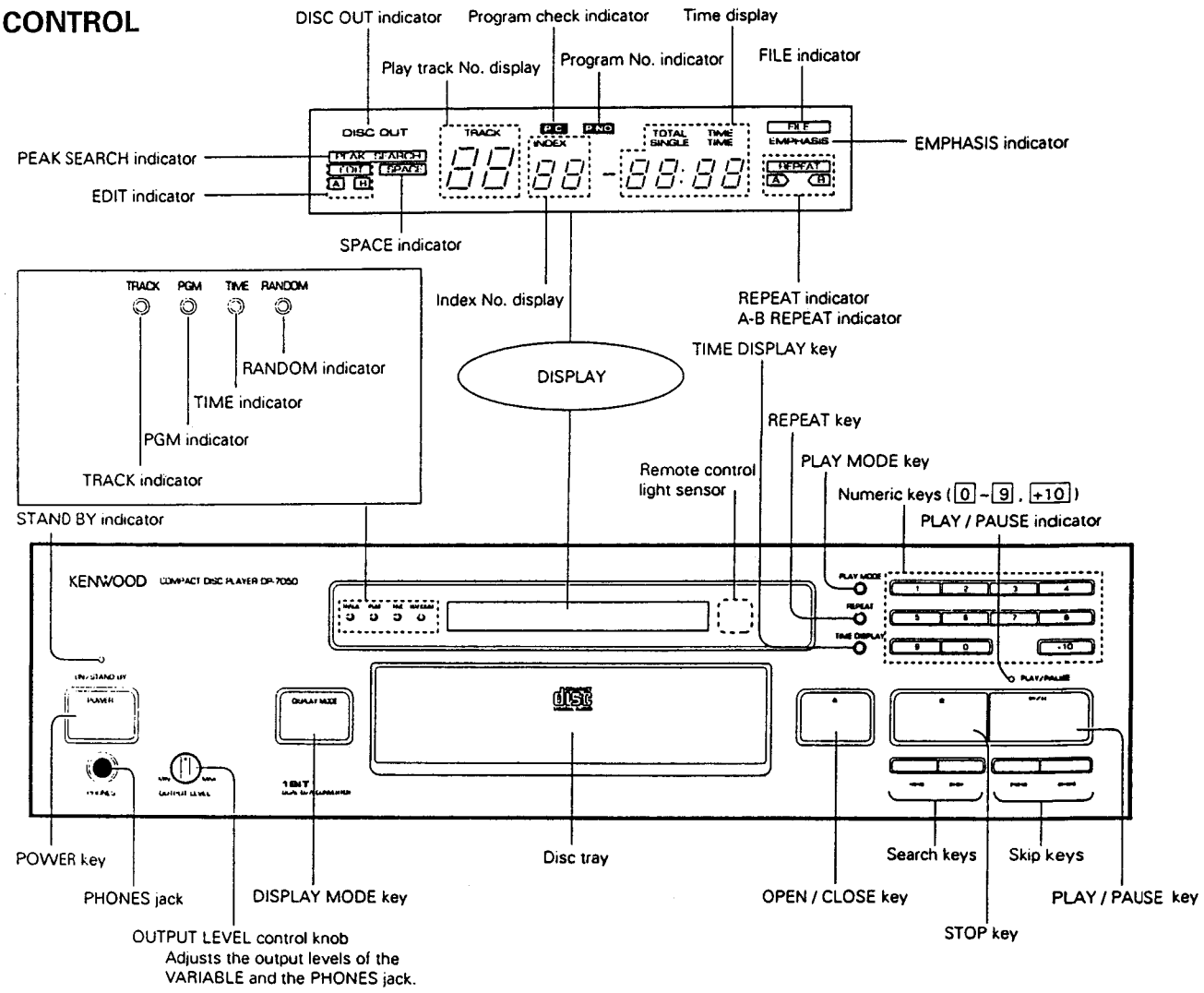


Note related to transportation and movement

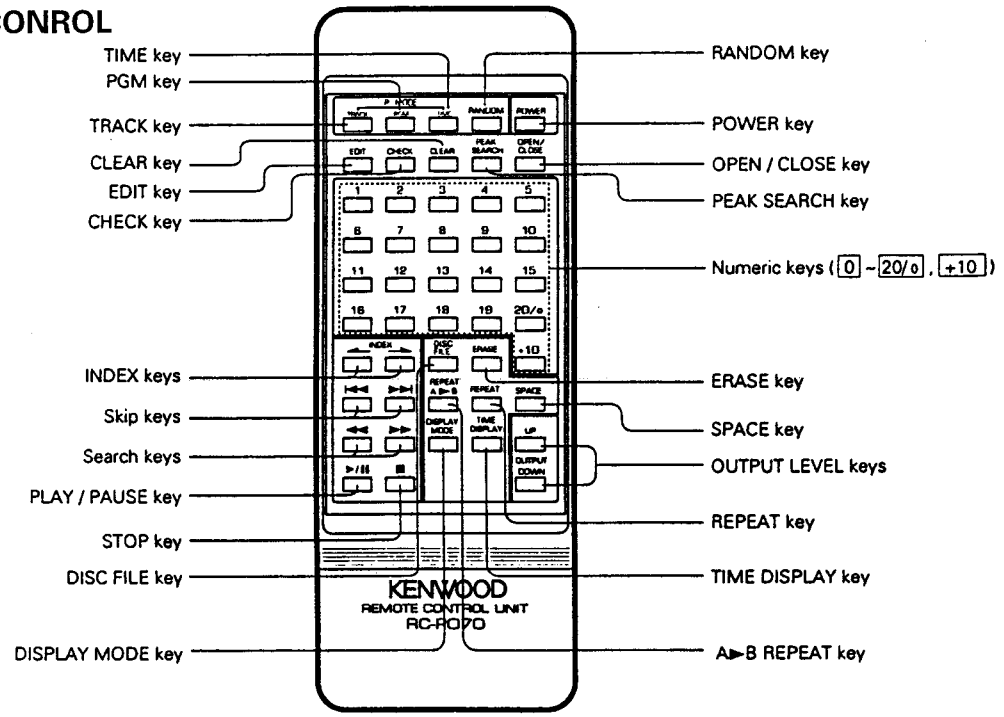
Before transporting or moving this unit, carry out the following operations.
1. Turn the power ON but do not load a disc.
2. Wait a few seconds and verify that the display shown appears.
3. Turn the power OFF.

CONTROL/REMOTE CONTROL OPERATION

CONTROL



REMOTE CONROL



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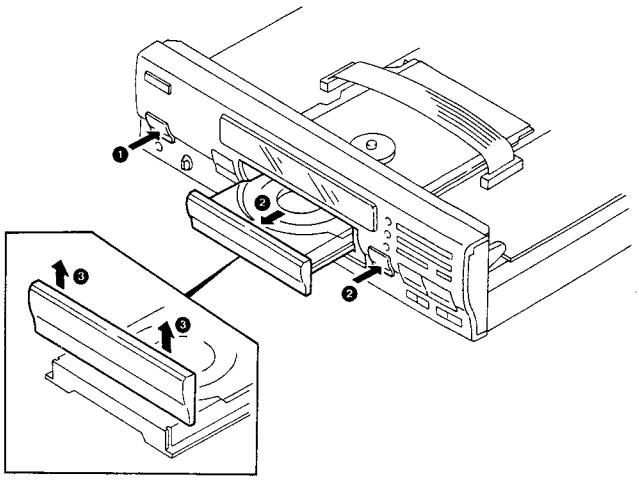
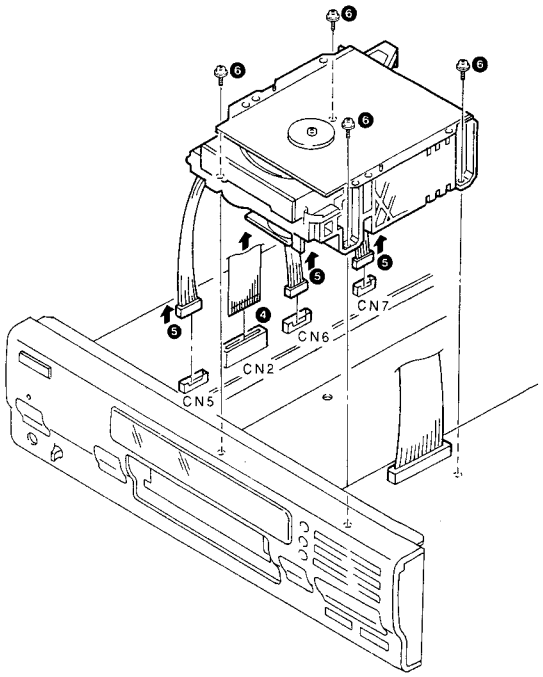
DISASSEMBLY FOR REPAIR

1. How to Disassemble

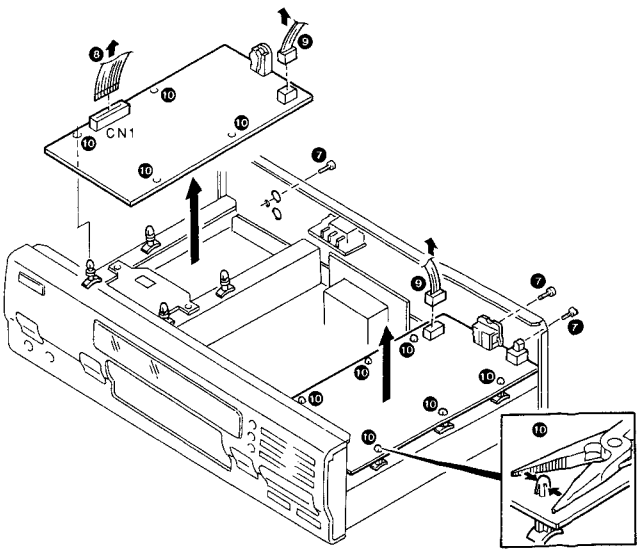
1. Push power switch to ON (❶).
2. Push open switch and slide the tray outwards (❷).
3. Remove the tray panel (❸).



4. Disconnect connector CN2 (❹).
5. Disconnect 3 connectors (❺).
6. Remove 4 screws (❻) and mechanism ass'y.

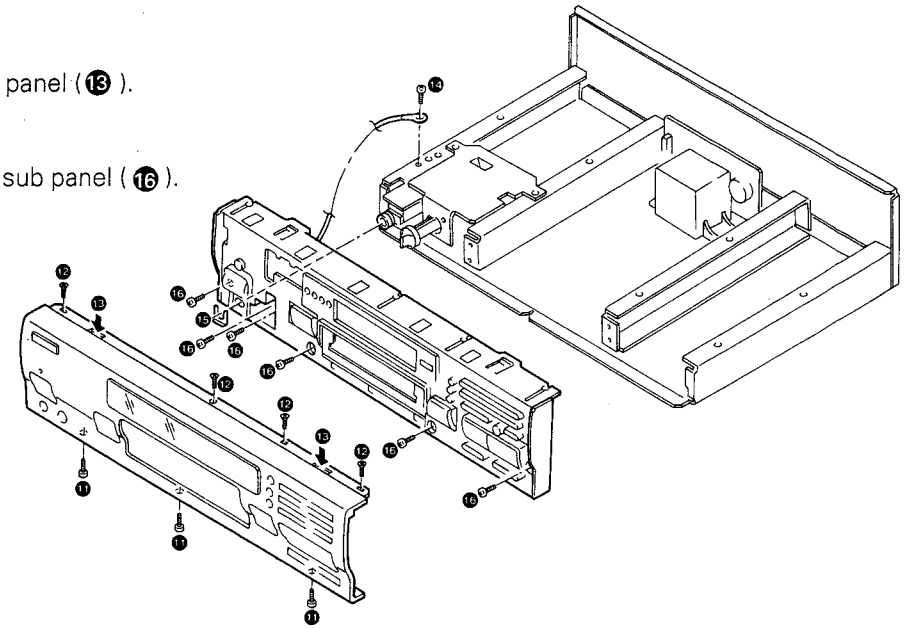


7. Remove 3 screws (❼).
8. Disconnect flexible pcb CN1 (❽).
9. Disconnect 2 connectors (❾).
10. Remove pcb board from 10 unit holders (❿).

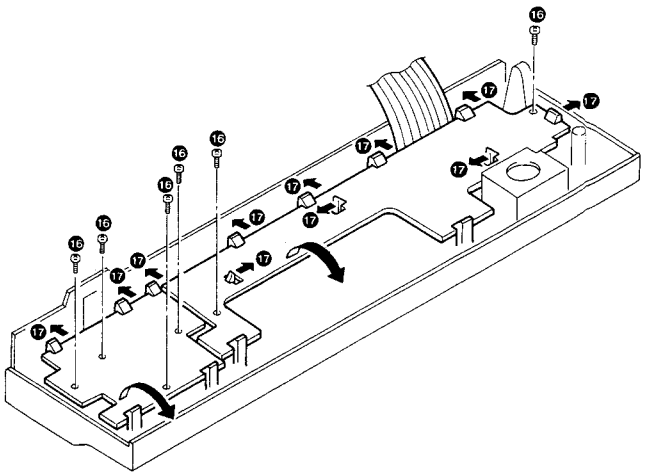


DISASSEMBLY FOR REPAIR

11. Remove 3 screws (⓫).
12. Remove 4 screws (⓬).
13. Remove sub panel catches from panel (⓭).
14. Remove 1 screw (⓮).
15. Remove phones stopper (⓯).
16. Remove 6 screws, then remove sub panel (⓰).

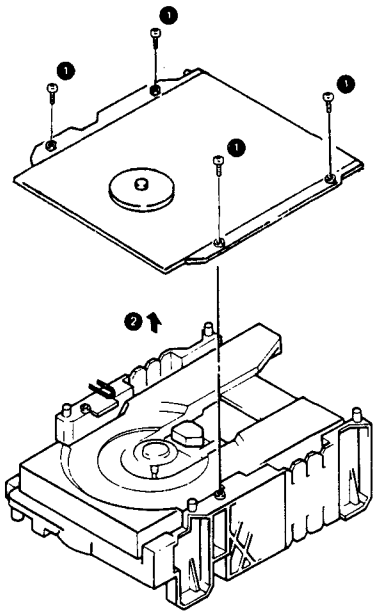


17. Remove 6 screws (⓰).
18. Remove 11 pcb catchers and pcb (⓱).



2. How to Remove Tray

1. Remove 4 screws (❶).
2. Remove clamper ass'y (❷).



Note : Don't miss the short pin for connecting laser pickup connector while clamper ass'y is removed.

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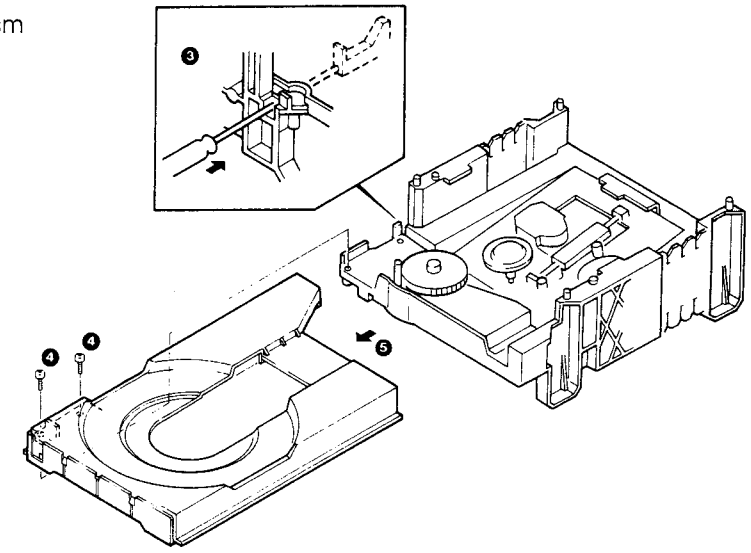
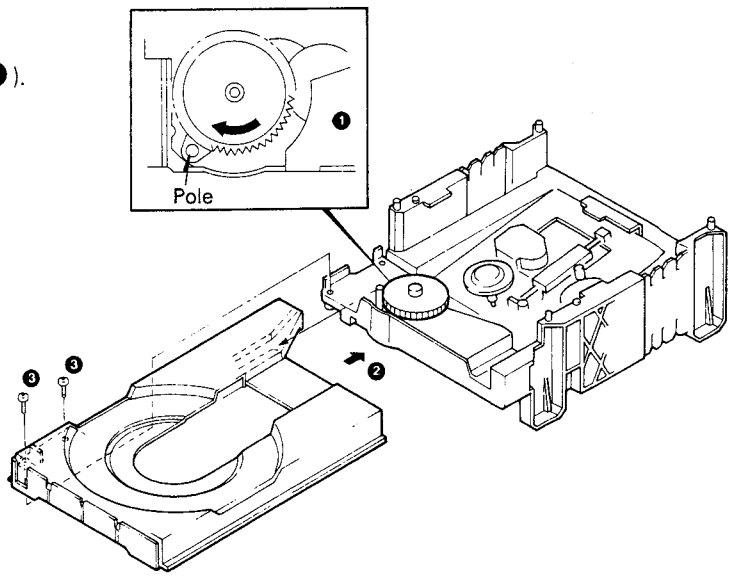
DISASSEMBLY FOR REPAIR

3. Insert the driver to left-side hole of mechanism ass'y and push the slider (❸).
4. Remove 2 screws (❹).
5. Tray can be pulled out (❺).



3. How to Mount Tray

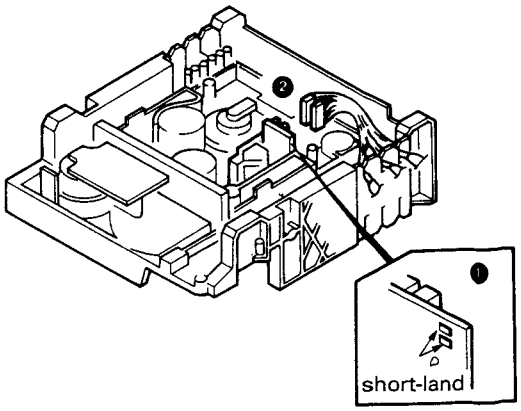
1. Set the pole to fully clockwise (❶).
2. Insert the tray to both-side guide on chassis (❷).
3. Fix 2 screws (❸).



4. How to Replace The Pickup

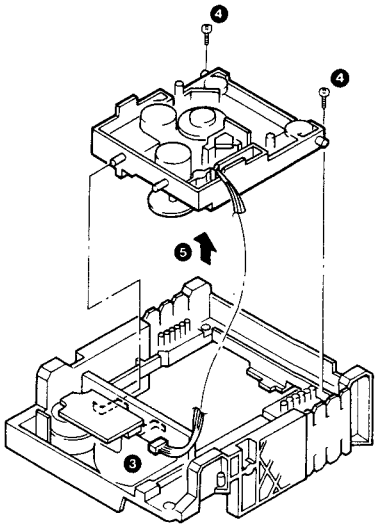
Short the short-land of the pickup before the following procedures (❶).

1. Disconnect 2 connectors (❷).

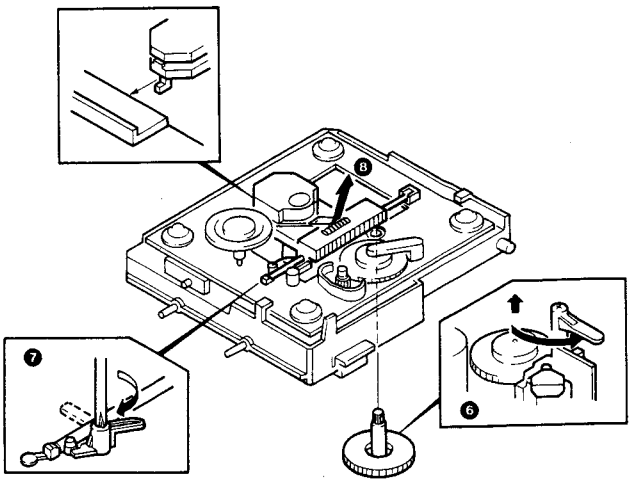


DISASSEMBLY FOR REPAIR

2. Disconnect the connector (❸).
3. Remove 2 screws (❹).
4. Remove the mechanism drive (MD) ass'y (❺).



5. Remove stopper and gear (❻).
6. Remove rod stopper (❼).
7. Remove the pickup ass'y (❽).



Note : When mounting the pickup, in the reverse order of disassembly. Unsolder the short land after connecting the flexible wire.

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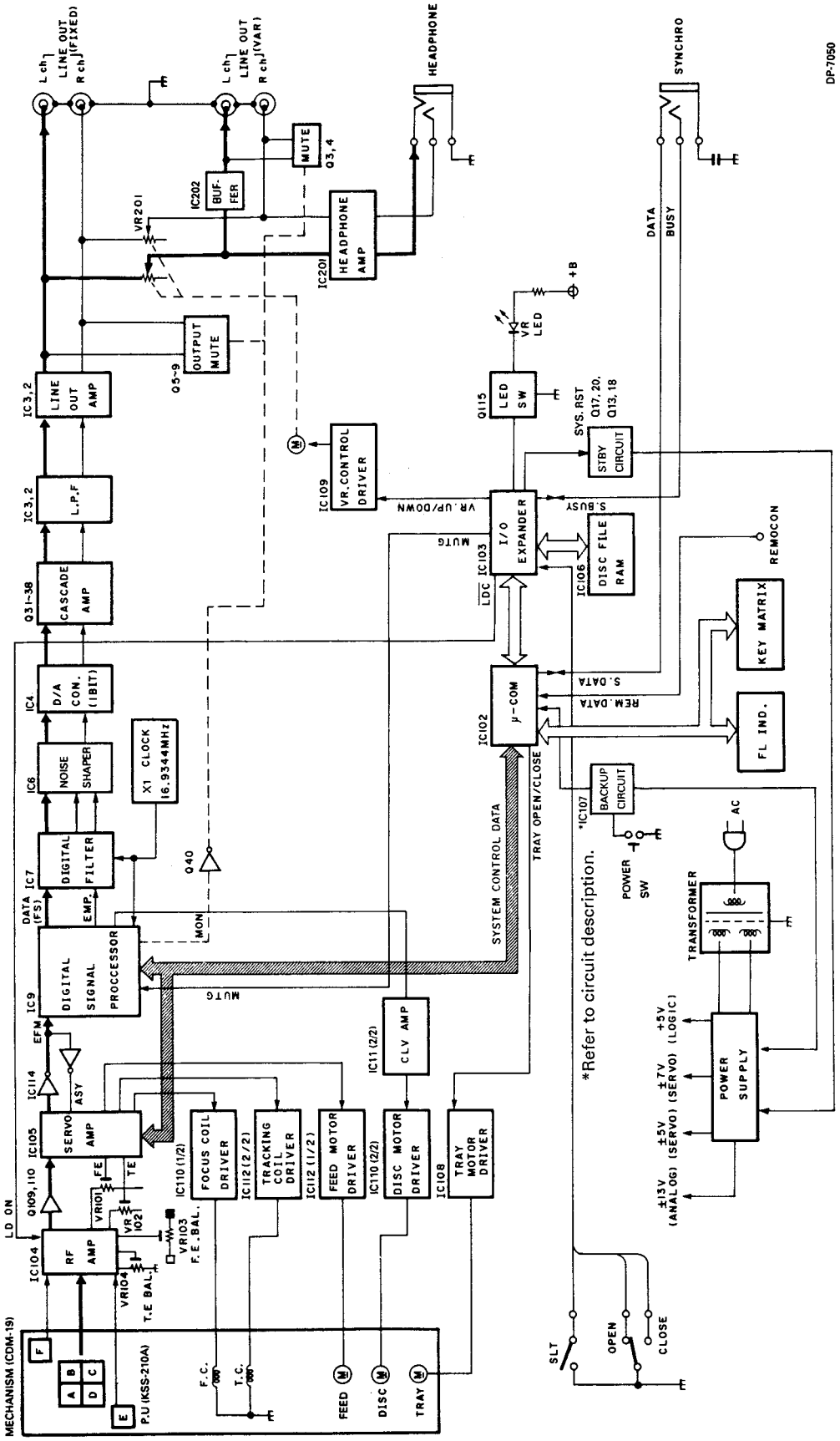
BLOCK DIAGRAM

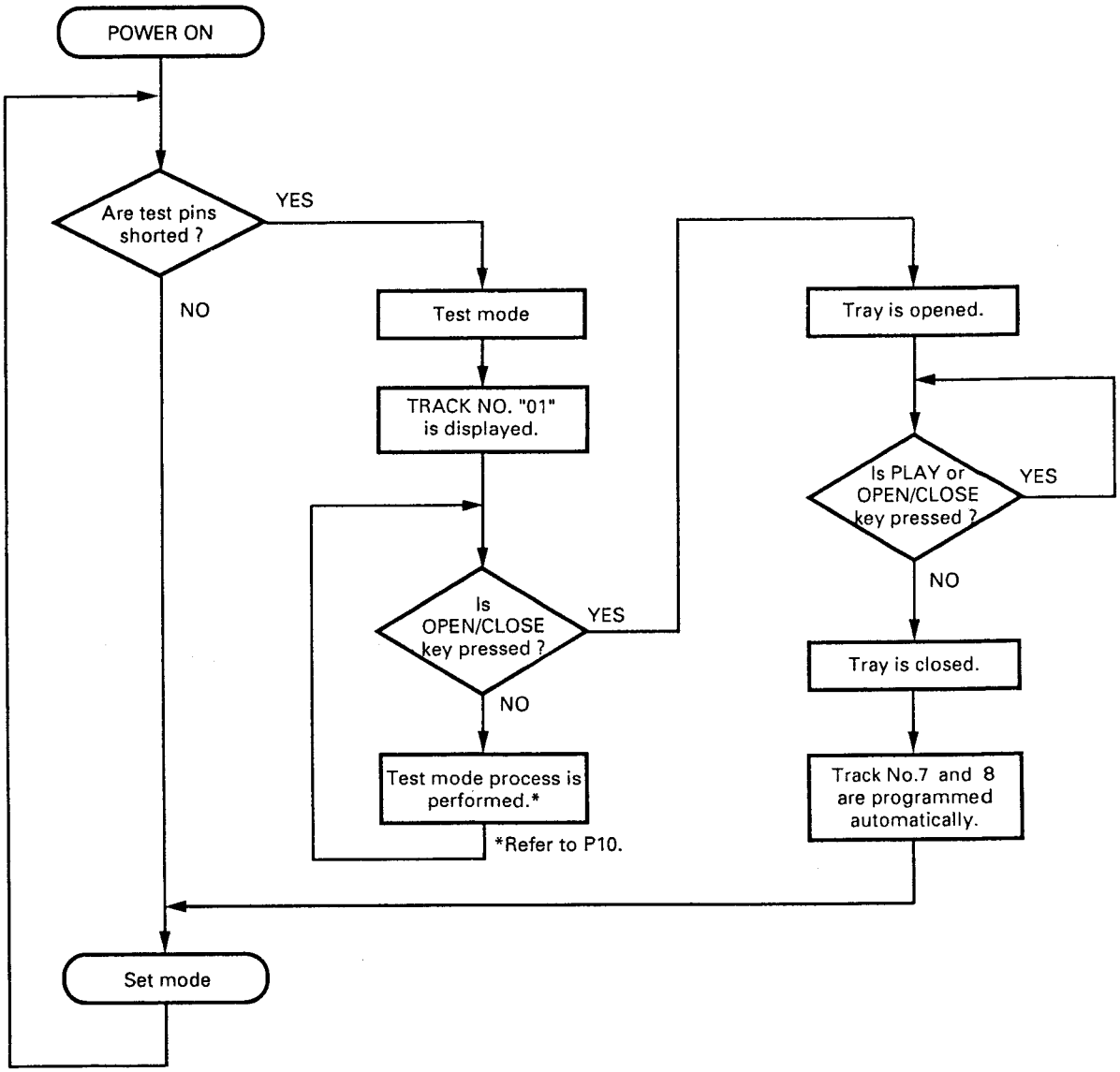


CIRCUIT DESCRIPTION

1. Test Mode

1-1. Setting the test mode

This microprocessor built in this unit (X32- B/5) can be put to TEST MODE by just short-circuiting the test pins (#4 and #5).



CIRCUIT DESCRIPTION

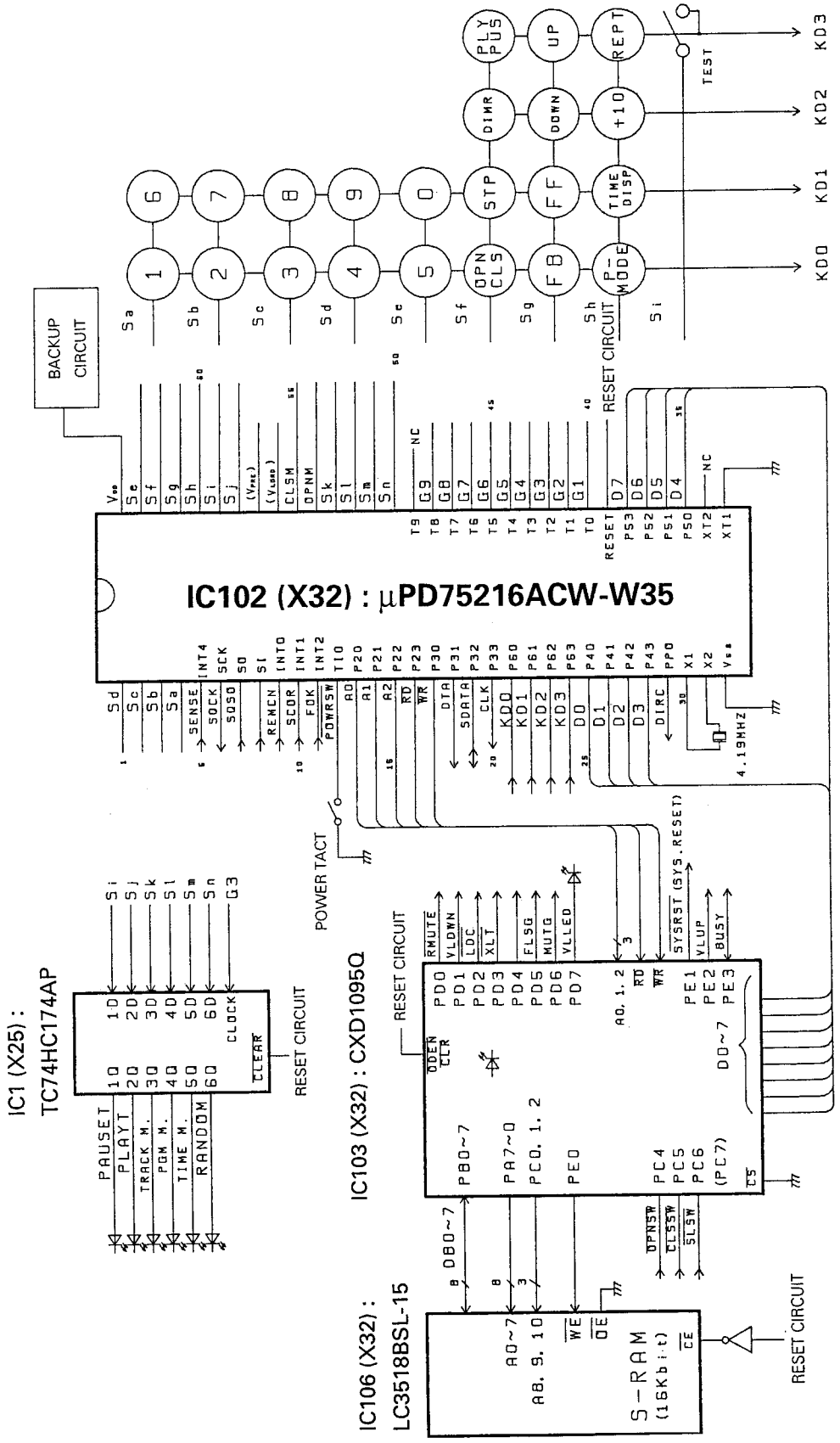
1-2. Key and functions valid in test mode

No.	Input key	Function	Track No. display
1	PLAY / PAUSE (▶/❚❚)	(1) Focusing servo ..... ON (2) Tracking servo ..... ON (3) Feed servo ..... ON	TRACK NO. 05 ↓ Displayed for a few seconds after completion (1), (2) and (3). ↓ Time ▶ (green Play mark), and Disc Track No. are displayed.
2	DISPLAY MODE	(1) Focusing servo ..... ON (2) Tracking servo ..... OFF (3) Feed servo ..... OFF	TRACK NO. 03 ▶ (orange)
3	STOP (■)	(1) Focusing servo ..... OFF (2) Tracking servo ..... OFF (3) Feed servo ..... OFF	TRACK NO. 01
4	UP (▶▶❙)	Turns all FL display lamps ON.	TRACK NO. 88
5	DOWN (❙◀◀)	Turns all FL display lamps OFF. "TRACK NO." is lighted.	TRACK NO. 88
6	OPEN / CLOSE (▲)	When the tray is opened then closed in test mode. Track No. 7 and 8 are programmed and set is in STOP mode. The test mode is canceled.	TRACK NO. 00
7	FF (▶▶)	In the STOP mode, moves the pickup toward the outer position of disc. The test mode is available at this condition.	TRACK NO. 02
8	FB (◀◀)	In the STOP mode, moves the pickup toward the inner position of disc. If turn on start limit switch, the pickup stops to move.	–

CIRCUIT DESCRIPTION

2. Microprocessor : μPD75216ACW-W35 (X32 : IC102)

2-1. Terminal connection diagram



CIRCUIT DESCRIPTION

2-2. Pin function : μPD75216ACW-W35 (X32 : IC102)

Pin No.	Pin name	I/O	Function
1~4	Sd~Sa	O	FL segment control terminals.
5	SENSE	I	Signal detection terminal for SENSE signal from processor and servo ICs.
6	SQCK	O	Q data read clock output terminal.
7	SQSO	I	Q data input terminal.
8	SI	–	N.C.
9	REMCN	I	Remote contol input terminal.
10	SCOR	I	Sub-code frame sync detection signal input terminal.
11	FOK	I	Input terminal for FOK signal from RF amp (focus OK : "H").
12	POWRSW	I	Power tact key input terminal.
13~15	A0~2	O	Control address for expander port IC of CXD1095Q.
16	$\overline{RD}$	O	Read control signal for CXD1095Q.
17	$\overline{WR}$	O	Write control signal for CXD1095Q.
18	DTA	O	Control serial data to CXD2500BQ.
19	SDATA	I/O	Serial data signal input/output terminal.
20	CLK	O	Clock for serial data to CXD2500BQ.
21~24	KD0~3	I	Input terminal for key return signal from key mtrix.
25~28	D0~3	I/O	Data bus to CXD1095Q (LSB 4bits).
29	–	O	–
30	X1	I	Input terminal of system clock (4.19MHz).
31	X2	I	Input terminal of system clock (4.19MHz).
32	Vss	–	GND.
33	XT1	–	Vss.
34	XT2	–	Open.
35~38	D4~7	I	Data bus to CXD1095Q (MSB 4bits).
39	$\overline{RESET}$	I	Reset input terminal (active "L").
40~48	G1~9	O	FL digit control terminals.
49	T9	–	N.C.
50~53	Sn~k	O	FL segments control terminals.
54	OPNM	O	Output terminal of tray-open signal.
55	CLSM	O	Output terminal of tray-close signal.
56	VLOAD	–	FL driver power supply.
57	VPRE	–	FL predriver power supply.
58~63	Sj~e	O	FL segment control terminals.
64	VDD	–	Power supply.

CIRCUIT DESCRIPTION

2-3. Pin function : CXD1095Q (X32 : IC103)

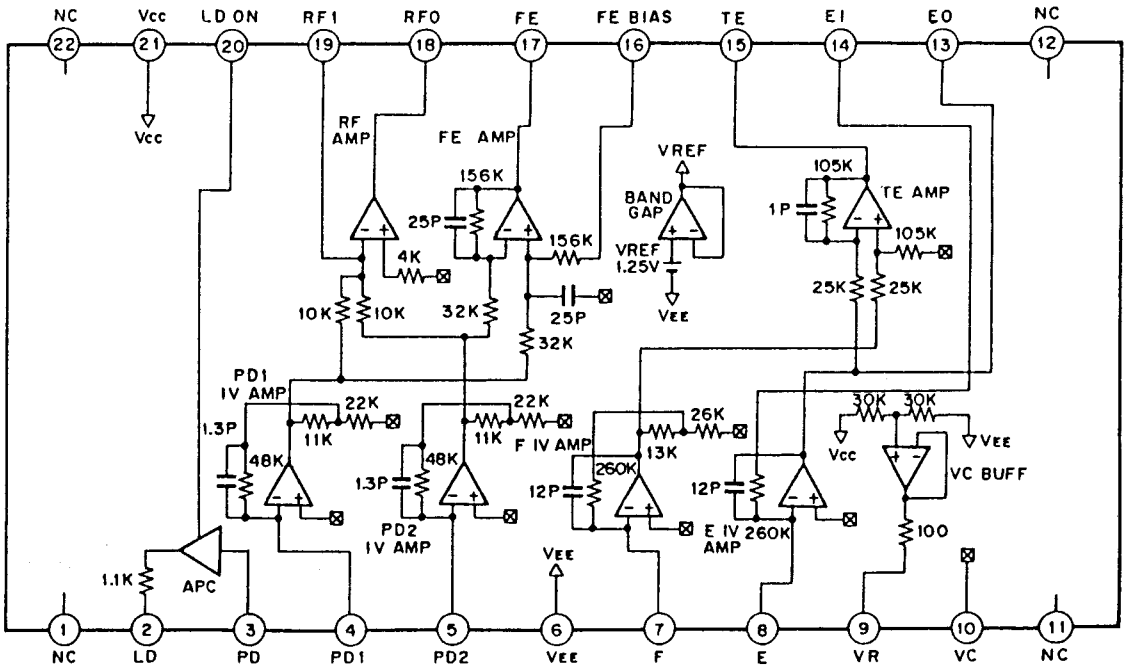
Pin No.	Pin name	I/O	Function
1, 2	N.C.	I	–
3~9	DB1~7	I/O	Data input/output terminals for RAM (LC3518), (MSB 7bits)
10	Vss	–	GND.
11~13	A8~10	O	Access address to LC3518.
14	–	–	Not used.
15	$\overline{\text{OPNSW}}$	I	Tray open switch (open : "L").
16	$\overline{\text{CLSSW}}$	I	Tray close switch (close : "L").
17	$\overline{\text{SLSW}}$	I	Sled limit switch (sw on : "L").
18	PC7	–	Not used.
19	N.C.	–	–
20	$\overline{\text{RMUTE}}$	O	Relay mute (active "L").
21	VLDWN	O	Motor drived volume to counter clockwise (active "H").
22	$\overline{\text{LDC}}$	O	Control signal of laser diode on-off (on : L).
23	$\overline{\text{XLT}}$	O	Latch signal of ending data output to CXD2500BQ.
24	CLK	O	Clock signal for 20 LEDs control.
25	Vss	–	GND.
26	VDD	–	Power supply.
27	FLSG	O	Display off : "H".
28	MUTG	O	Digital mute output to CXD2500BQ.
29	VLLED	O	LED indicator of motor drived volume.
30~32	D0~2	I/O	Data bus to microprocessor (LSB 3bits).
33, 34	N.C.	–	–
35~39	D3~7	I/O	Data bus to microprocessor (MSB 5bits).
40	$\overline{\text{CLR}}$	I	Connect to RESET circuit.
41	$\overline{\text{OPEN}}$	I	Connect to RESET circuit.
42	Vss	–	GND.
43	$\overline{\text{WR}}$	I	Write strobe signal to write data from microprocessor to CXD1095Q.
44	$\overline{\text{RD}}$	I	Read strobe signal to read data from CXD1095Q to microprocessor.
45	$\overline{\text{CS}}$	I	Connect to GND.
46~48	A0~2	O	Address for ports and control register.
49	$\overline{\text{WE}}$	O	Write enable to write data to LC3518 (write : "L").
50	$\overline{\text{OE}}$	O	Connect to GND.
51	N.C.	–	–
52	VLUP	O	Motor drived volume to clockwise (active "H").
53	BUSY	I/O	Serial busy signal input/output terminal.
54~56	PA0~2	O	Address port to LC3518 (LSB 3-bits).
57	Vss	–	GND.
58	VDD	–	Power supply.
59~63	PA3~7	O	Address port to LC3518 (LMB 5bits).
64	DB0	I/O	Data input/output terminal to LC3518 (LSB).

CIRCUIT DESCRIPTION

3. RF Amplifier : CXA1571S (X32 : IC104)

CXA1571S is an IC developed for compact disc players. It contains an RF amplifier for 3 spot optical pickup, focus error amplifier, tracking error amplifier, and APC circuit.

3-1. Block diagram



3-2. Pin function

Pin No.	Pin name	I/O	Function
2	LD	O	APC LD amplifier output pin.
3	PD	I	APC LD amplifier input pin.
4	PD1	I	RF I-V amplifier inverted input pin. Current input by connecting to the photo diode A+C terminals.
5	PD2	I	RF I-V amplifier inverted input pin. Current input by connecting to the photo diode B+D terminals.
7	F	I	F I-V amplifier inverted input pin. Current input by connecting to the photo diode F terminal.
8	E	I	E I-V amplifier inverted input pin. Current input by connecting to the photo diode E terminal.
9	VR	O	CD voltage output pin of (Vcc+Vee) /2.
10	VC	I	Connected GND when using dual power supply (+).
			Connected to VR (pin 9) when using a single power supply.
13	EO	O	E output of I-V amplifier.
14	EI	–	E I-V amplifier feedback input pin. For E I-V amplifier gain adjustment.
15	TE	O	Tracking error amplifier output pin.
16	FE-BIAS	I	Bias pin on the focus error amplifier non-inverted side.
17	FE	O	Focus error amplifier output pin.
18	RFO	O	RF summing amplifier output pin.
19	RFI	I	Inverted input pin of RF amplifier. Gain of amplifier is fixed by resistor between RFO and RFI.
20	LD-ON	I	LD ON / OFF select pin (Vcc : ON).

CIRCUIT DESCRIPTION

4. Servo Signal Processor : CXA1372Q (X32 : IC105)

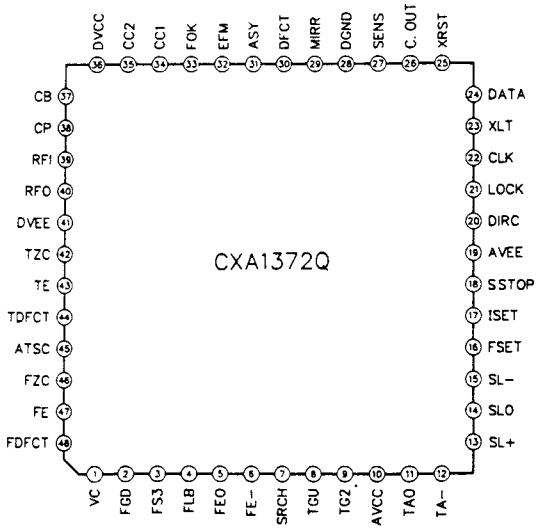
Outline

CXA1372Q is a bipolar IC developed to be used for processing of the RF signal (Focus OK, mirror, defect, comparator of EFM) and servo control.

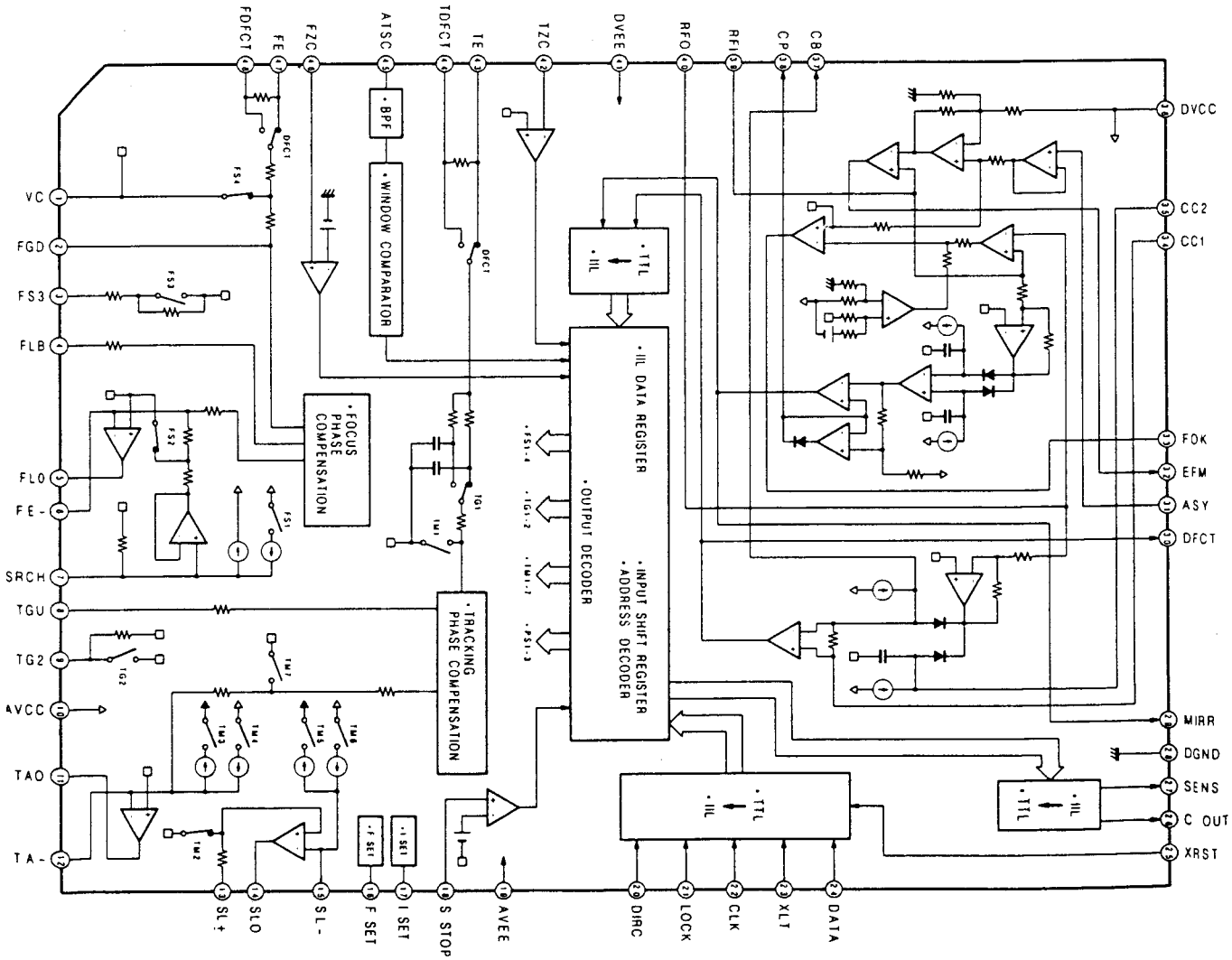
Functions

- Auto asymmetry control
- Focus OK detection circuit
- Mirror detection circuit
- Defect detection and countermeasure circuit
- EFM comparator
- Focus servo control
- Tracking servo control
- Sled servo control

4-1. Pin connection



4-2. Block diagram



CIRCUIT DESCRIPTION

4-3. Pin functions

Pin No.	Pin name	I/O	Function
1	VC	I	Middle-point voltage input terminal. When two power sources are used : GND, when single power source is used : (Vcc+GND)/2.
2	FGD	I	When lowering the high-band gain of the focus servo, insert a capacitor between this terminal and terminal No. 3.
3	FS3	I	Change the high-band gain of the focus servo by turning FS3 on and off.
4	FLB	I	Outside terminal of time constant for raising the low-band of the focus servo.
5	FEO	O	Focus drive output.
6	FE–	I	Inverted input terminal of focus amplifier.
7	SRCH	I	Outside terminal of time constant for making focus search waveform.
8	TGU	I	Outside terminal of time constant for changing high-band gain of tracking.
9	TG2	I	Outside terminal of time constant for changing high-band gain of tracking.
10	AVCC		
11	TAO	O	Tracking drive output.
12	TA–	I	Inverted input terminal of tracking amplifier.
13	SL+	I	Non-inverted input terminal of sled amplifier.
14	SLO	O	Sled drive output.
15	SL–	I	Inverted input terminal of sled amplifier.
16	FSET	I	Terminal for setting the peak for phase compensation of focus tracking.
17	ISET	I	Current for determining the height of the focus search track jump sled kick is applied.
18	SSTOP	I	Terminal for ON/OFF detecting signal of limit switch for detecting the most inside line of disc.
19	AVEE		
20	DIRC	I	Used to jump over one track. 47kΩ pull-up resistor is inserted.
21	LOCK	I	When "L", sled runaway-preventive circuit operates. 47kΩ pull-up resistor is inserted.
22	CLK	I	Clock input for transferring the serial data from CPU (having no pull-up resistors).
23	XLT	I	Latch input from CPU (having no pull-up resistors).
24	DATA	I	Serial data input from CPU (having no pull-up resistors).
25	XRST	I	Reset when reset input terminal is at "L" (having no pull-up reisitors).
26	SENS	O	Outputs FZC, AS, TZC, SSTOP, etc. on receipt of command from CPU.
27	C. OUT	O	Signal output for counting tracks.
28	DGND		
29	MIRR	O	Output terminal of MIRR comparator. (DC voltage : Load of 10kΩ connected)
30	DFCT	O	Output terminal of DEFECT comperator. (DC voltage : Load 10kΩ connected)
31	ASY	I	Input terminal of auto asymmetry control.
32	EFM	O	Output terminal of EFM comparator. (DC voltage : Load of 10kΩ connected)
33	FOK	O	Output terminal of focus OK comparator. (DC voltage : Load of 10kΩ connected)
34	CC1	I	DEFECT bottom hold output terminal.
35	CC2	O	Terminal in which DEFECT bottom hold output is input after capacitive coupling.
36	DVCC		
37	CB	I	Terminal to which DEFECT bottom hold capacitor is connected.
38	CP	I	Terminal for connecting MIRR hold comparator. Non-inverted input terminal of MIRR comparator.
39	RFI	I	Terminal in which output of RF summing amplifier is input after capacitive coupling.
40	RFO	O	Output terminal of RF summing amplifier. Check point of eye pattern.
41	DVEE		
42	TZC	I	Input terminal of tracking zero cross comparator.
43	TE	I	Input terminal of tracking error.
44	TDFCT	I	Terminal for connecting the capacitor for time constant in case of defect.
45	ATSC	I	Input terminal of window comparator for detecting ATSC. (Anti-shock)
46	FZC	I	Terminal for inputting the focus zero cross comparator.
47	FE	I	Input terminal of focus error.
48	FDFCT	I	Terminal for connecting capacitor for time constant in case of defect.

CIRCUIT DESCRIPTION

5. Digital Signal Processor : CXD2500BQ (X32 : IC9)

Outline

The CXD2500BQ is a digital signal processing LSI for a compact disc player, which has the following functions.

- A wide frame jitter margin realized by 32K-RAM (±28 frames)
- Bit clocks for strobing EFM signal are generated by the digital PLL, and the capture range is ±150kHz minumum.
- Demodulation of EFM data.
- Protection and reinforcement of EFM frame sync signal.
- Strong error correction by refined super strategy. C1 : Double correction, C2 : Quadruple correction.
- Reduction of noise generation at track jumps.
- Auto zero cross muting.
- Demodulation of sub-code and detection of errors in sub-code Q data.
- Digital spindle servo (Having over-sampling filter).
- 16-bit traverse counter.
- CPU interface by serial bus.
- A built-in servo auto sequencer.
- Output for digital audio interface.
- Built-in digital level meter and peak meter.
- Applicable to bilingual system.

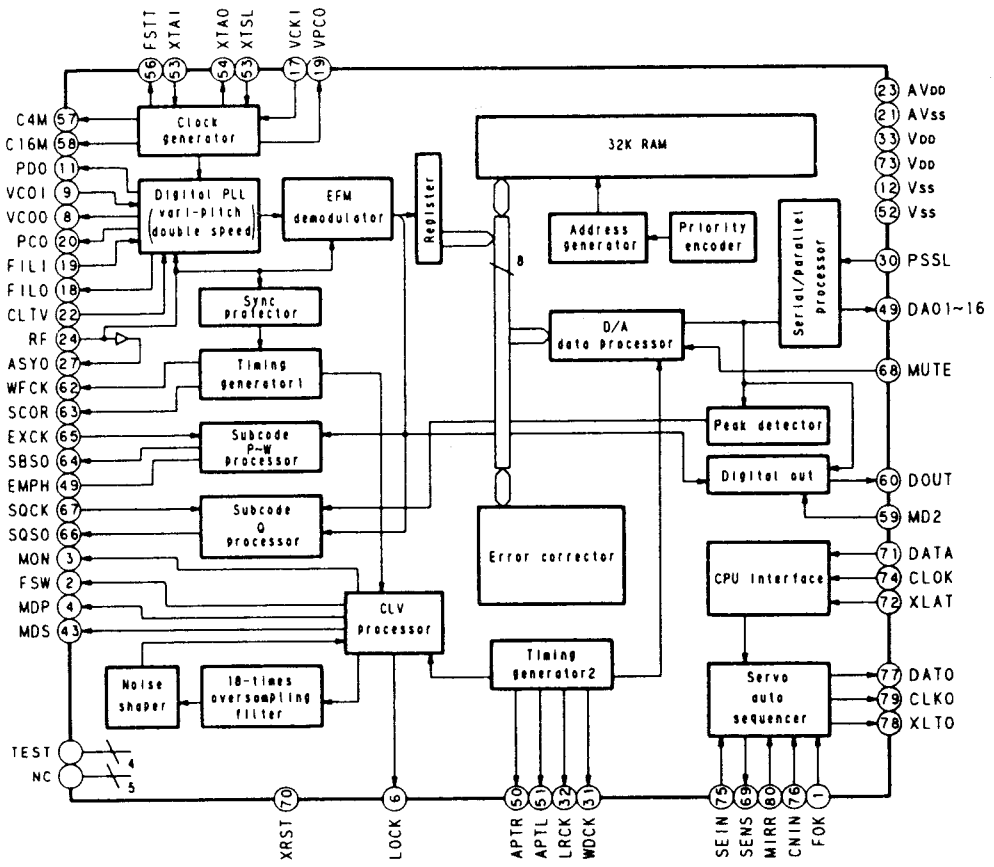
Features

- One chip of this LSI can process all the digital signals used for replay.
- Integration level can be heightened because of the built-in RAM.

Structure

Silicon gate CMOS.

5-1. Block diagram



CIRCUIT DESCRIPTION

5-2. Pin functions

Pin No.	Pin name	I/O	Function
1	FOK	I	Focus OK input terminal. Used for SENS output and servo auto sequencer.
2	FSW	O	Output for changing output filter of spindle motor.
3	MON	O	ON/OFF control output of spindle motor.
4	MDP	O	Servo control of spindle motor. (Phase)
5	MDS	O	Servo control of spindle motor. (Speed)
6	LOCK	O	Outputs "H", when GFS is sampled at 460Hz and it is "H". Output "L", if "L" is detected eight times continuously.
7	NC	–	Not used.
8	VCOO	O	Oscillation circuit output for analog EFM PLL.
9	VCOI	I	Oscillation circuit input for analog EFM PLL. f_{LOCK} = 8.6436MHz
10	TEST	I	Test terminal, normally grounded.
11	PDO	O	Charge pump output for analog EFM PLL.
12	V_{SS}	–	GND.
13~15	NC	–	Not used.
16	VPCO	O	PLL charge pump output for variable pitch.
17	VCKI	I	Clock input $f_{Ccenter}$ = 16.9344MHz from outside VCO for variable pitch.
18	FILO	O	Filter output for master PLL (Slave = Digital PLL).
19	FILI	I	Filter input for master PLL.
20	PCO	O	Charge pump output for master PLL.
21	AV_{SS}	–	Analog GND.
22	CLTV	I	VCO control voltage input for master.
23	AV_{DD}	–	Analog power source (+5V).
24	RF	I	EFM signal input.
25	TEST2	I	Used for grounding.
26	TEST3	I	Used for grounding.
27	ASYO	O	EFM full swing output ("L" = V_{SS}, "H" = V_{DD}).
28	TEST4	I	Used for grounding.
29	NC	–	Not used.
30	PSSL	I	Audio data output mode changing input. Set to "L" for serial output and "H" for parallel output.
31	WDCK	O	D/A interface for 48-bit slot. Word clock f = 2 Fs
32	LRCK	O	D/A interface for 48-bit slot. LR clock f = Fs
33	V_{DD}	–	Source voltage (+5V).
34	DA16	O	Outputs DA16 (MSB) when PSSL = 1. Outputs serial data of 48-bit slot when PSSL = 0. (2s' COMP, MSB first)
35	DA15	O	Outputs DA15 when PSSL = 1. Outputs bit clock of 48-bit slot when PSSL = 0.
36	DA14	O	Outputs DA14 when PSSL = 1. Outputs serial data of 64-bit slot when PSSL = 0. (2s' COMP, LSB first)
37	DA13	O	Outputs DA13 when PSSL = 1. Outputs bit clock of 64-bit slot when PSSL = 0.
38	DA12	O	Outputs DA12 when PSSL = 1. Outputs LR clock of 64-bit slot when PSSL = 0.
39	DA11	O	Outputs DA11 when PSSL = 1. Outputs GTOP when PSSL = 0.
40	DA10	O	Outputs DA10 when PSSL = 1. Outputs XUGF when PSSL = 0.
41	DA09	O	Outputs DA09 when PSSL = 1. Outputs XPLCK when PSSL = 0.
42	DA08	O	Outputs DA08 when PSSL = 1. Outputs GFS when PSSL = 0.
43	DA07	O	Outputs DA07 when PSSL = 1. Outputs RFCK when PSSL = 0.
44	DA06	O	Outputs DA06 when PSSL = 1. Outputs C2P0 when PSSL = 0.
45	DA05	O	Outputs DA05 when PSSL = 1. Outputs XRAOF when PSSL = 0.
46	DA04	O	Outputs DA04 when PSSL = 1. Outputs MNT3 when PSSL = 0.
47	DA03	O	Outputs DA03 when PSSL = 1. Outputs MNT2 when PSSL = 0.
48	DA02	O	Outputs DA02 when PSSL = 1. Outputs MNT1 when PSSL = 0.
49	DA01	O	Outputs DA01 when PSSL = 1. Outputs MNT0 when PSSL = 0.

CIRCUIT DESCRIPTION

Pin No.	Pin name	I/O	Function
50	APTR	O	Control output for correcting aperture. Set to "H" when Rch.
51	APTL	O	Control output for correcting aperture. Set to "H" when Lch.
52	Vss	–	GND.
53	XTAI	I	X'tal oscillation circuit input of 16.9344MHz, or input of 33.8688MHz.
54	XTAO	O	X'tal oscillation circuit output of 16.9344MHz.
55	XTSL	I	X'tal selection input terminal. Set to "L" when x'tal is 16.9344MHz, and to "H" when 33.8688MHz.
56	FSTT	O	2/3 division output of terminals 53 and 54. Does not vary as pitch varies.
57	C4M	O	4.2336MHz output. Varies as pitch varies.
58	C16M	O	16.9344MHz output. Varies as pitch varies.
59	MD2	I	Digital-out ON/OFF control. Turns on when "H", and off when "L".
60	DOUT	O	Digital-out output terminal.
61	EMPH	O	Outputs "H" when playing disc has emphasis, and "L" when the latter does not.
62	WFCK	O	WFCK (Write Frame Clock) output.
63	SCOR	O	Outputs "H" when sub-code sync S0 or S1 is detected.
64	SBSO	O	Serial output of Sub P ~ W.
65	EXCK	I	Clock input for SBSO read out.
66	SQSO	O	Sub Q 80-bit and PCM peak, and level data 16-bit output.
67	SQCK	I	Clock input for SQSO read out.
68	MUTE	I	Mutes when "H", and resets when "L".
69	SENS	–	Outputs SENS to CPU.
70	XRST	I	Resets system when "L".
71	DATA	I	Inputs serial data from CPU.
72	XLAT	I	Latches serial data when latch input from CPU falls.
73	VDD	–	Power supply (+5V).
74	CLOK	I	Serial data transfer clock input from CPU.
75	SEIN	I	Input SENS from SSP.
76	CNIN	I	Inputs signals for counting number of track jumps.
77	DATO	O	Outputs serial data to SSP.
78	XLTO	O	Outputs serial data latch to SSP, and latches at fall.
79	CLKO	O	Outputs serial data transfer clock to SSP.
80	MIRR	I	Inputs mirror signal. Auto sequencer uses this for jumping 128 or more tracks.

Notes

- The 64-bit slot is 2's compliment output of LSB first, and the 48-bit slot is 2's compliment output of MSB first.
- GTOP is used to monitor the protective condition of the frame sync. ("H" : Sync protective window is released.)
- XUGF is the frame sync obtained from the EFM signal, which is a negative pulse. This is the signal before the protection of sync.
- XPLCK is the inverted clock of EFM PLL. PLL is so made that the falling edge will be matched to the change point of the EFM signal.
- The GFS becomes "H" when the frame sync is matched to the internal protection timing.
- RFCK is a signal having the period of 136μ obtained by the accuracy of X'tal.
- C2P0 is a signal indicating the error condition of data.
- XRAOF is a signal generated when 32 KRAM exceeds the jitter margin of ±28F.

CIRCUIT DESCRIPTION

6. Digital Filter : SM5840CP (X32 : IC7)

Outlne

This LSI is a digital filter for 8 times over-sampling (interpolation) for a digital audio playback device. This is LSI accepts not only 16 bit signals but also 18 bit signals, and outputs 16, 18 or 20 bit signals. Accordingly, this LSI can be a wide interface.

In addition, this LSI has the digital de-emphasis function matched to 3fs, the noise shaping function to reduce re-quantized noises, etc.

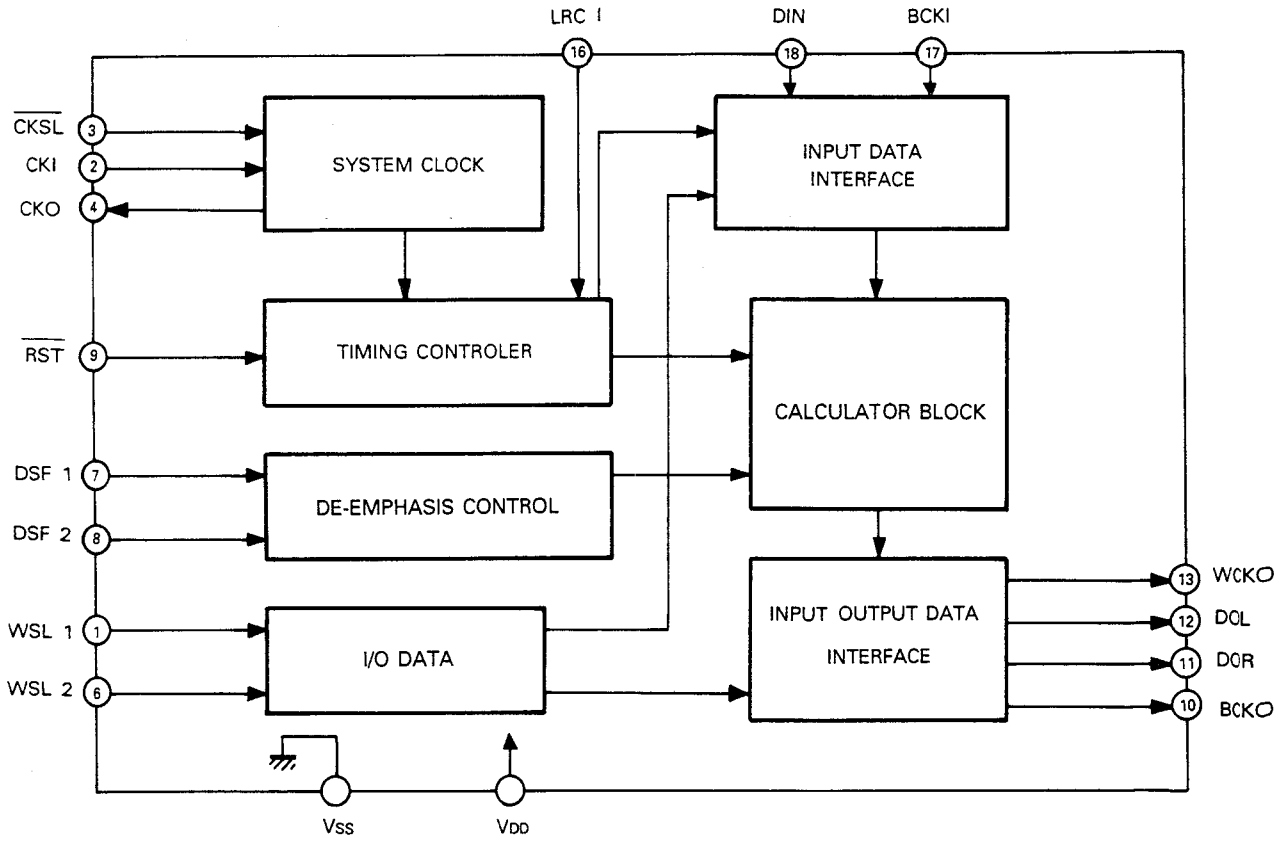
Features and functions

- 2 channel processing
- 8 times over-sampling (interpolation) (Hereinafter referred to as 8fs)
- Digital de-emphasis (Matched to 3fs of 48kHz, 44.1kHz and 32kHz)
- Serial input data
  2's complementary, MSB first, selection of 16 or 18 bit signal.
- Serial output data
  MSB first, 2's complementary, selection of 16 or 18 bit signal.
- Primary noise shaper (Turned on only when 16 or 18 bit signal is output)
- Selection of system clock of 256fs or 384fs
- Input / Output TTL compatible
- Signal power source of 5V (Standard)
- Can be operated with low voltage (3.2V)
- 18 pin plastic DIP

Composition of filter

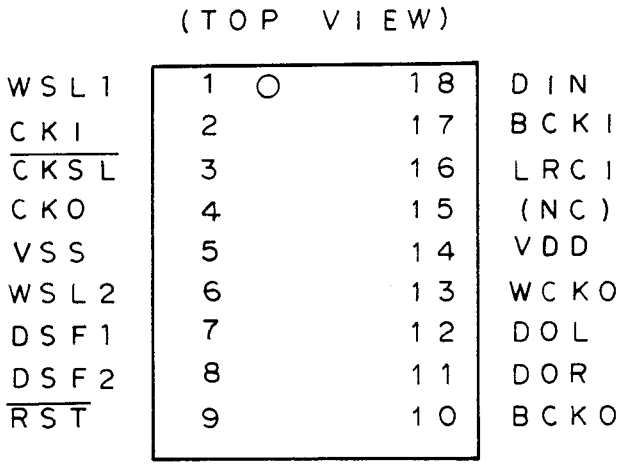
- Interpolation of filter (Straight line phase FIR filters of 3 stages)
  1st stage (fs ⟶ 2fs) : Degree 69
  2nd stage (2fs ⟶ 4fs) : Degree 13
  3rd stage (4fs ⟶ 8fs) : Degree 9
- De-emphasis filter
  Accurate gain and phase characteristics are obtained by the composition of IIR filter
- Highly accurate calculation with (19 x 14) bit parallel multiplier and 24 bit accumulator
- Built in overflow limiter

6-1. Block diagram



CIRCUIT DESCRIPTION

6-2. Pin connections



6-3. Explanation of terminals

("fs" in the following explanation represents the sampling frequency of the data.)

Pin No.	Pin name	I/O	Function
1	WSL1	Ip	Input / Output data word length.
2	CKI	I	Input terminal of system clock.
3	$\overline{CKSL}$	I	System clock selection terminal (384fs when $\overline{CKSL}$ is "H"), (256fs when $\overline{CKSL}$ is "L").
4	CKO	O	System clock output terminal (CKI clock is buffered, then output).
5	Vss	–	GND.
6	WSL2	Ip	Input / Output data word length selection terminal 2.
7	DSF1	Ip	De-emphasis selection terminal 1.
8	DSF2	Ip	De-emphasis selection terminal 2.
9	$\overline{RST}$	Ip	System resetting (Resets and initializes when $\overline{RST}$ is "L".)
10	BCKO	O	Output bit clock.
11	DOR	O	Rch 8fs data output.
12	DOL	O	Lch 8fs data output.
13	WCKO	O	Output word clock.
14	VDD	–	Power source terminal (Standard 5V).
15	(NC)	–	(Terminal not connected.)
16	LRCI	Ip	Sample rate (fs) clock of input data .
17	BCKI	Ip	Input bit clock.
18	DIN	Ip	Input data.

Pin No. 1 — Input / Output data word length.

Setting of terminal		Noise shaper	I/O data word length	
WSL1	WSL2		Number of bits of Input	Number of bits of output
H	H	OFF	18bit	20bit
H	L	ON	18bit	20bit
L	H	ON	16bit	18bit
L	L	ON	16bit	16bit

Pin No. 7 — De-emphasis selection terminal 1.

Setting of terminal		De-emphasis	
DSF1	DSF2	ON /OFF	fs
L	L	ON	44.1kHz

Pin No. 8 — De-emphasis selection terminal 2.

Setting of terminal		De-emphasis	
DSF1	DSF2	ON /OFF	fs
L	H	ON	48.0kHz
H	H	ON	32.0kHz
H	L	OFF	–

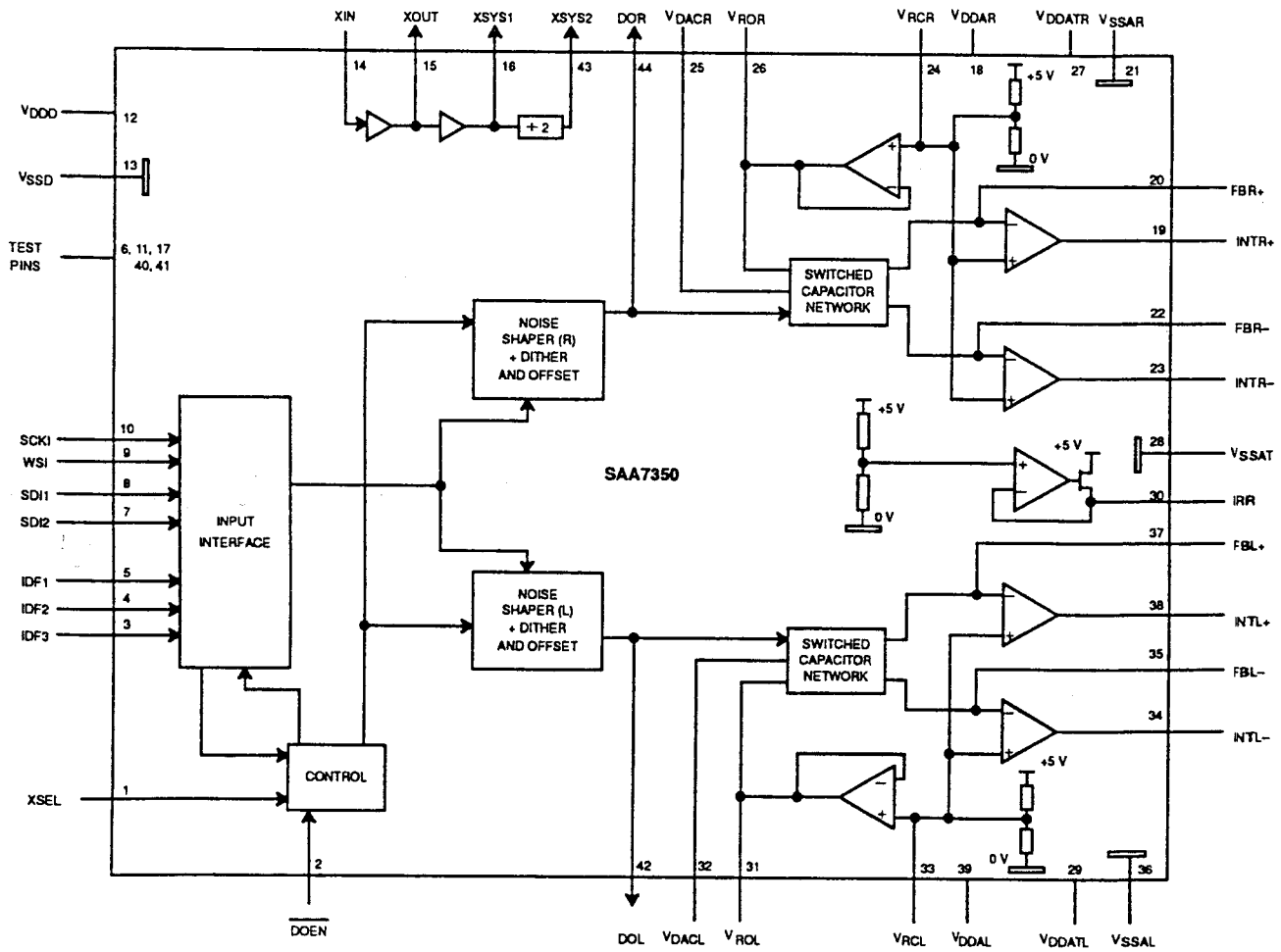
CIRCUIT DESCRIPTION

7. 20-bit Input Bitstream Conversion DAC : SAA7350 (X32 : IC6)

7-1. General description

The SAA7350 is a CMOS digital-to-analog converter using Philips bitstream conversion technique. The device also can be used with the TDA1547 device.

7-2. Block diagram



CIRCUIT DESCRIPTION

7-3. Pin function

Pin	Symbol	I/O	Description
1	XSEL	I	Crystal frequency select; this pin is used to select the master crystal frequency as follows : XSEL HIGH =384fs, XSEL LOW=256fs; if unconnected the pin will default HIGH.
2	$\overline{\text{DOEN}}$	I	One-bit digital output enable; when LOW, the one-bit code outputs are made available for TDA1547; if unconnected the pin will default HIGH (not connected).
3~5	IDF3~IDF1	I	Input data format; these three pins determine the input format the device is to operate in (see functional description); if unconnected these pins will default HIGH (i. e. burst clock mode).
6	TEST4	–	Test 4; this pin should be connected GND line.
7	SDI2	I	Serial data input; used in simultaneous mode only (for the right channel signal).
8	SDI1	I	Serial data input; this should be a 16, 18 or 20-bit linear 2's complement PCM signal; in simultaneous mode this pin is used for the left channel signal.
9	WSI	I	Serial input word select signal; signifies whether data word is for the left or right channel; can be either fs, 2fs, 4fs or 8fs where fs is the system sampling frequency; fs can be between 16kHz and 53kHz.
10	SCKI	I	Bit clock input for the serial input interface.
11	TEST1	–	Test 1; this pin should be left open-circuit.
12	V_{DDD}	–	+5V power supply for the digital section.
13	V_{SSD}	–	Ground connection for the digital section.
14	XIN	I	Crystal oscillator input.
15	XOUT	O	Crystal oscillator output.
16	XSYS1	O	Buffered oscillator output.
17	TEST5	–	Test 5; in normal operation this pin should be tied LOW.
18	V_{DDAR}	–	Connected to ground.
19	INTR+	O	Output from the right positive switched-capacitor integrator; input to differential operational amplifier. (Connected to ground).
20	FBR+	–	Feedback connection for the right positive switched-capacitor integrator. (Connected to ground).
21	V_{SSAR}	–	0V supply for right channel. (Connected to ground).
22	FBR–	–	Feedback connection for the right negative switched-capacitor integrator. (Connected to ground).
23	INTR–	O	Output from the right negative switched-capacitor integrator; input to differential operational amplifier. (Connected to ground).
24	V_{RCR}	–	High impedance voltage reference for right channel inputs; typically $V_{DDAR}/2$. (Connected to ground).
25	V_{DACR}	–	Reference voltage supply for right channel DAC's; normally this will be connected to V_{SS}. (Connected to ground).
26	V_{ROR}	O	Right channel voltage reference output; typically $V_{DDAR}/2$. (Connected to ground).
27	V_{DDATR}	–	5V supply for right channel analog timing. (Connected to ground).
28	V_{SSAT}	–	0V supply for left and right channel analog timing. (Connected to ground).
29	V_{DDATL}	–	5V supply for left channel analog timing. (Connected to ground).
30	IRR	–	24kΩ bias resistor connection for the reference current generator circuit. (Connected to ground).
31	V_{ROL}	O	Left channel voltage reference output; typically $V_{DDAL}/2$. (Connected to ground).
32	V_{DACL}	–	Reference voltage supply for left channel DAC; normally this will be connected to V_{SS}. (Connected to ground).
33	V_{RCL}	–	High impedance voltage reference for left channel inputs and for bias current generator; typically $V_{DDAL}/2$. (Connected to ground).
34	INTL–	O	Output from the left negative switched-capacitor integrator; input to differential operational-amplifier. (Connected to ground).
35	FBL–	–	Feedback connection for the left negative switched-capacitor integrator. (Connected to ground).
36	V_{SSAL}	–	0V supply for left channel. (Connected to ground).
37	FBL+	–	Feedback connection for the left positive switched-capacitor integrator. (Connected to ground).
38	INTL+	O	Output from the left positive switched-capacitor integrator; input to differential operational-amplifier. (Connected to ground).
39	V_{DDAL}	–	Analog 5V supply for left channel. (Connected to ground).
40	TEST2	–	Test 2; this pin should be left open-circuit.
41	TEST3	–	Test 3; this pin should be left open-circuit.
42	DOL	O	Digital output left; left channel one-bit code for TDA1547.
43	XSYS2	O	Output clock at a frequency of half the master clock frequency.
44	DOR	O	Digital output right; right channel one-bit code for TDA1547.

CIRCUIT DESCRIPTION

7-4. Functional description

General

The SAA7350 bitstream conversion CMOS DAC contains a flexible interface supporting a variety of formats. This enables it to be used with a number of available digital filters with wordlengths of up to 20-bits and upsampling up to 8fs.
The system sampling frequency (fs) can be between 16kHz and 53kHz.

The analog section contains four one-bit DACs operated in differential mode to achieve high performance signal-to-noise ratio, channel separation and total harmonic distortion.

Input interface

The SAA7350 supports the following modes :

- I²S with dataword rates of fs, 2fs or 4fs with wordlengths of up to 20-bits. A minimum of 16-bit-clock cycles per word is required.
- Sony serial format for dataword rate of fs, 2fs, or 4fs with wordlengths of 16, 18 or 20-bits. As this format idles on the MSB it is necessary to know how many bits are being transmitted.
- Simultaneous mode for dataword rates of fs, 2fs, 4fs or 8fs with wordlengths of up to 20-bits idling on the least significant bit. A minimum of 16-bit-clock cycles per word is required.
- Simultaneous mode for dataword rates of fs, 2fs, 4fs and 8fs with wordlengths of 18 or 20-bits idling on the MSB. As this format idles on the MSB it is necessary to know how many bits are being transmitted.
- Simultaneous mode for dataword rates of fs, 2fs, 4fs or 8fs with wordlengths of up to 20-bits using burst clocks (see next page). A minimum of 16-bits-clock cycles is required. This mode is restricted to having the bit clock at less than or equal to half the master clock frequency supplied to the SAA7350.

The choice of these formats is given by the pins IDF1 to IDF3 as shown below.

7-5. Input data formats

IDF3	IDF2	IDF1	format
0	0	0	I²S format up to 20-bits
0	0	1	Sony serial format 16-bits
0	1	0	Sony serial format 18-bits
0	1	1	Sony serial format 20-bits
1	0	0	Simultaneous format idling on LSB up to 20-bits
1	0	1	Simultaneous format idling on MSB 18-bits
1	1	0	Simultaneous format idling on MSB 20-bits
1	1	1	Simultaneous format burst clock up to 20-bits (DP-7050's setting)

The transfer on the serial input has to be synchronous to the master clock.

Clock frequency

The device can run at an input clock frequency of either 384fs or 256fs (pin XSEL) outputting a system clock at the same frequency on XSYS1 and half input clock frequency on XSY2. fs can be between 16kHz and 53kHz.

Noise shaping

Third order noise shaping is implemented on the SAA7350 to give an improved signal-to-noise ratio. DC offset and out-of-band dither is added to prevent idle patterns in the audio band.

Bitstream conversion DAC

The digital-to-analog conversion in the SAA7350 is performed using the Philips bitstream conversion technique. The input from the digital filter is oversampled to 8fs by means of a digital sample and hold and converted to a 1-bit pulse density modulated (PDM) signal.

A switched capacitor technique is used for the bitstream conversion to convert the PDM signal to an analog signal. A fixed charge is either added or subtracted from the virtual earth node of an integrator. As this output is a continuous time output a highly symmetrical operational amplifier is used to give a low distortion figure.

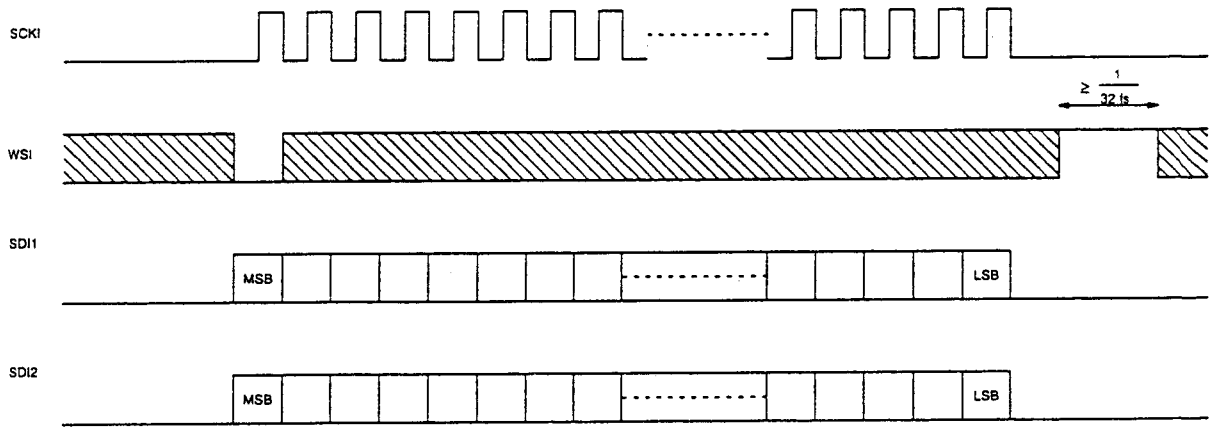
In order to increase the output signal-to-noise ratio and THD performance, internal operational-amplifiers are provided so that the devise is operated in differential mode. With this technique, any common mode signals cancel thus improving the signal-to-noise ratio and total harmonic distortion.

TDA1547 interface

The SAA7350 can also be used to provide oversampling and noise shaping for the TDA1547. One-bit codes and clock outputs are supplied for inputs to the TDA1547.

CIRCUIT DESCRIPTION

7-6. Simultaneous burst clock input format



CIRCUIT DESCRIPTION

8. Bitstream DAC (1-bit) : TDA1547 (X32 : IC4)

8-1. General description

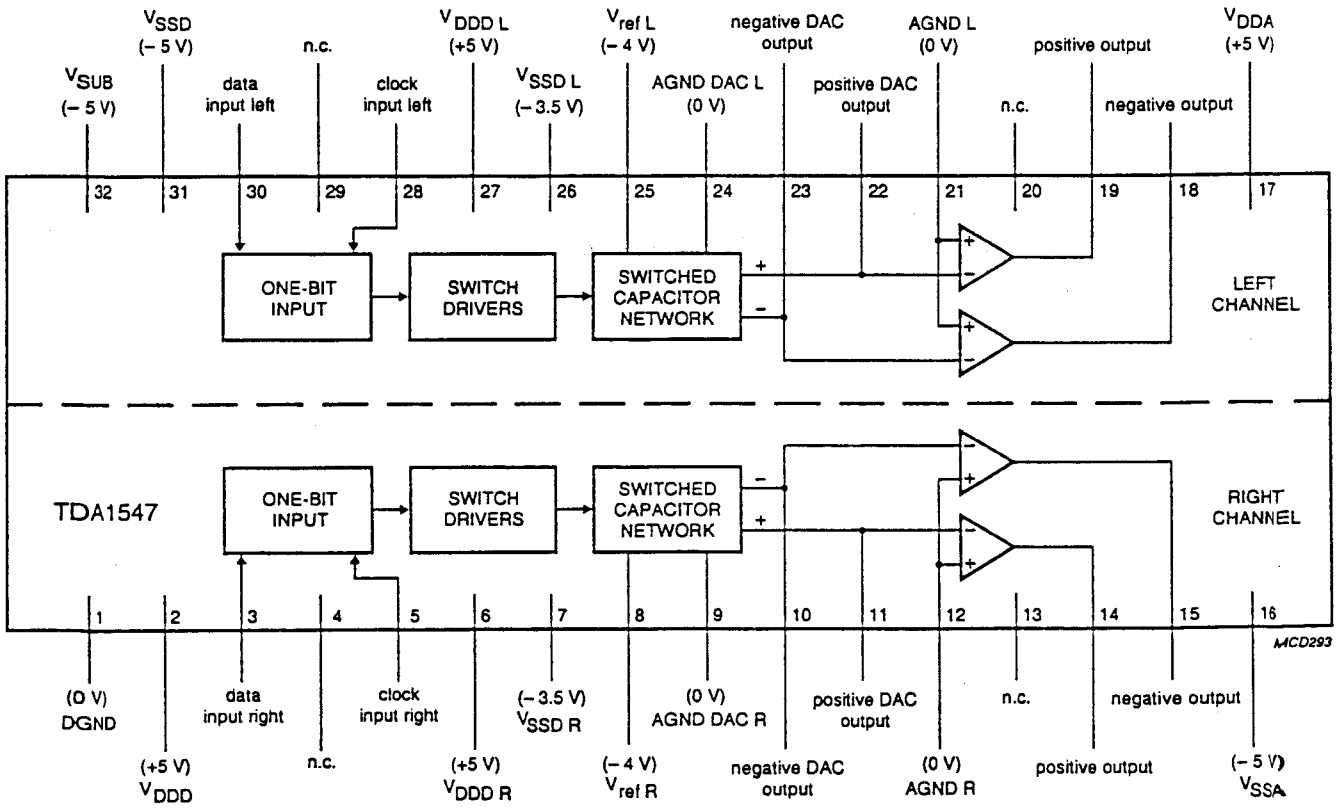
The TDA1547 is a dedicated one-bit digital-to-analog converter to facilitate a high fidelity sound reproduction of digital audio. The TDA1547 is extremely suitable for use in high quality audio systems such as Compact Disc and DAT players, or in digital amplifiers and digital signal processing systems.

The TDA1547 is used in combination with the SAA7350 bitstream circuit, which includes the third-order noise shaper. The excellent performance of the SAA7350 and TDA1547 bitstream conversion system is obtained by separating the noise shaping circuit and the one-bit conversion circuit over two IC's thereby reducing the crosstalk between the digital and analog parts.

The TDA1547 one-bit converter is processed in BIMOS. In the digital logic and drivers bipolar transistors are used to optimize speed and to reduce digital noise generation. In the analog part the bipolar transistors are used to obtain high performance of the operational amplifiers. Special layout precautions have been taken to achieve a high crosstalk immunity .

The layout of the TDA1547 has fully separated left and right channels and supply voltage lines between the digital and analog sections.

8-2. Block diagram



CIRCUIT DESCRIPTION

8-3. Pin functions

Pin	Symbol	I/O	Description
1	DGND	–	0V digital supply.
2	V_{DDD}	–	5V digital supply for both channels.
3	IN R	I	Serial one-bit data input for the right channel.
4	n.c.	–	Pin not connected; should preferably be connected to digital ground.
5	CLK R	I	Clock input for the right channel .
6	$V_{DDD\ R}$	–	5V digital supply for the right channel; this voltage determines the internal logic HIGH level in the right channel.
7	$V_{SSD\ R}$	–	–3.5V digital supply for the right channel; this voltage determines the internal logic LOW level in the right channel.
8	$V_{REF\ R}$	–	–4V reference voltage for the right channel switched capacitor DAC.
9	AGND DAC R	–	0V reference voltage for the right channel switched capacitor DAC; this pin should be connected to analog ground.
10	–DAC R	O	Output from the right negative switched capacitor DAC; feedback connection for the right negative operational amplifier.
11	+DAC R	O	Output from the right positive switched capacitor DAC; feedback connection for the right positive operational amplifier.
12	AGND R	–	0V reference voltage for both right channel operational amplifiers.
13	n.c.	–	Pin not connected; should preferably be connected to analog ground.
14	+OUT R	O	+ output of the switched capacitor operational amplifier.
15	–OUT R	O	– output of the switched capacitor operational amplifier.
16	V_{SSA}	–	–5V analog supply.
17	V_{DDA}	–	5V analog supply.
18	–OUT L	O	– output of the switched capacitor operational amplifier.
19	+OUT L	O	+ output of the switched capacitor operational amplifier.
20	n.c.	–	Pin not connected; should preferably be connected to analog ground.
21	AGND L	–	0V reference voltage for both left channel operational amplifiers.
22	+DAC L	O	Output from the left positive switched capacitor DAC; feedback connection for the left positive operational amplifier.
23	–DAC L	O	Output from the left negative switched capacitor DAC; feedback connection for the left negative operational amplifier.
24	AGND DAC L	–	0V reference voltage for the left channel switched capacitor DAC; this pin should be connected to analog ground.
25	$V_{REF\ L}$	–	–4V reference voltage for the left channel switched capacitor DAC.
26	$V_{SSD\ L}$	–	–3.5V digital supply for the left channel; this voltage determines the internal logic LOW level in the left channel.
27	$V_{DDD\ L}$	–	5V digital supply for the left channel; this voltage determines the internal logic HIGH level in the left channel.
28	CLK L	I	Clock input for the left channel.
29	n.c.	–	Pin not connected; should preferably be connected to digital ground.
30	IN L	I	Serial one-bit data input for the left channel.
31	V_{SSD}	–	–5V digital supply for both channels.
31	V_{SUB}	–	–5V substrate voltage.

8-4. Function description

Both channels are completely separated to reach the desired high crosstalk suppression level. Each channel consists of the following functional parts :

- One-bit input, which latches the incoming data to the system clock.
- Switch driver circuit, which generates the non-overlapping clock- and data-signals that control the DAC switched capacitor networks.
- Switched capacitor network, this forms the actual DAC function, it supplies charge packets to the low-pass filter, under control of the incoming one-bit code.
- Two high performance operational amplifiers, that perform the charge packet to voltage conversion and deliver a differential output signal. The first pole of the low-pass filter is built around them.

CIRCUIT DESCRIPTION

9. Power Supply Backup Circuit (X32 :)

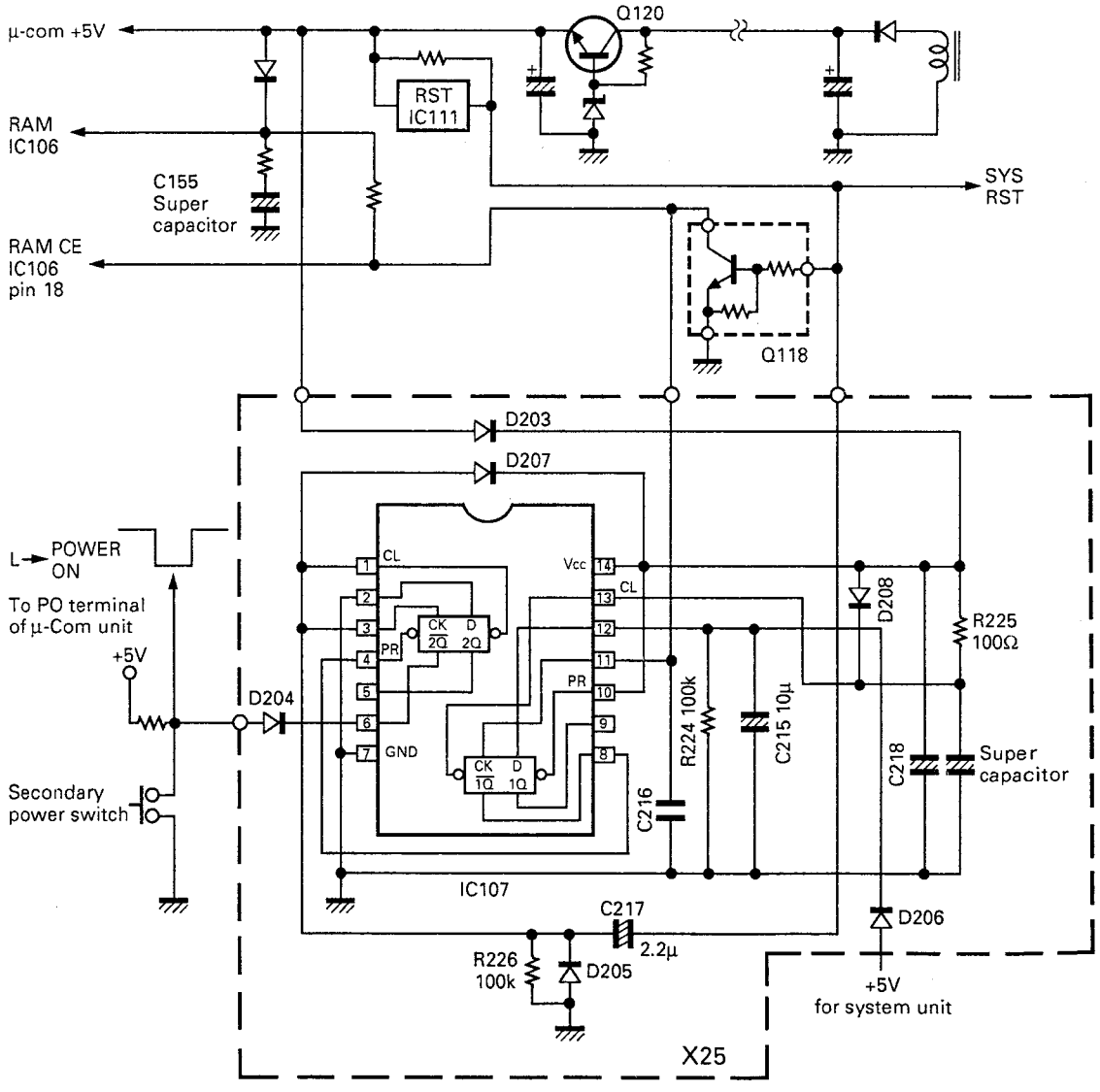
9-1. Explanation of operation

This circuit memorize the ON/OFF operations of the secondary power. For this circuit, the CE signals for backing up the IC106 RAM for disc file and the power of +5V for the system unit (which is turned on and off by turning on and off the secondary power switch).

When the primary plug is disconnected, the CE signal changes from L to H to set the RAM in the backup mode. This CE signal is set as CLK of the D flip-flop and the +5V for the system unit is set the data to maintain H/L of the +5V for the system unit.

The flip-flop of the next stage is used for the AND operation of the maintained data (1Q → PR) and the differential pulse of the RST signal which changes from L to H when the primary plug is connected. Only when the maintained data (PR) is L, the L pulse is output to $\overline{2Q}$ to turn on the secondary power.

9-2. Block diagram



MECHANISM OPERATION DESCRIPTION

Mechanism Operation Description

Fig. 1 shows the relationship of mechanisms in the STOP mode. The OPEN/CLOSE operation of the mechanism and the UP/DOWN operation of the pickup chassis when loading the disc are description below.

Note 1 : The black arrow (OPEN) and the while arrow (CLOSE) in the operation description have the following meanings :
Black arrow (OPEN) : Tray opening direction (Tray OPEN)
White arrow (CLOSE): Tray closing direction (Tray CLOSE)

Note 2 : Figures in the bracket ( ) in the operation description or accompanied with the part name in the diagra show the reference numbers in the Exploded View.

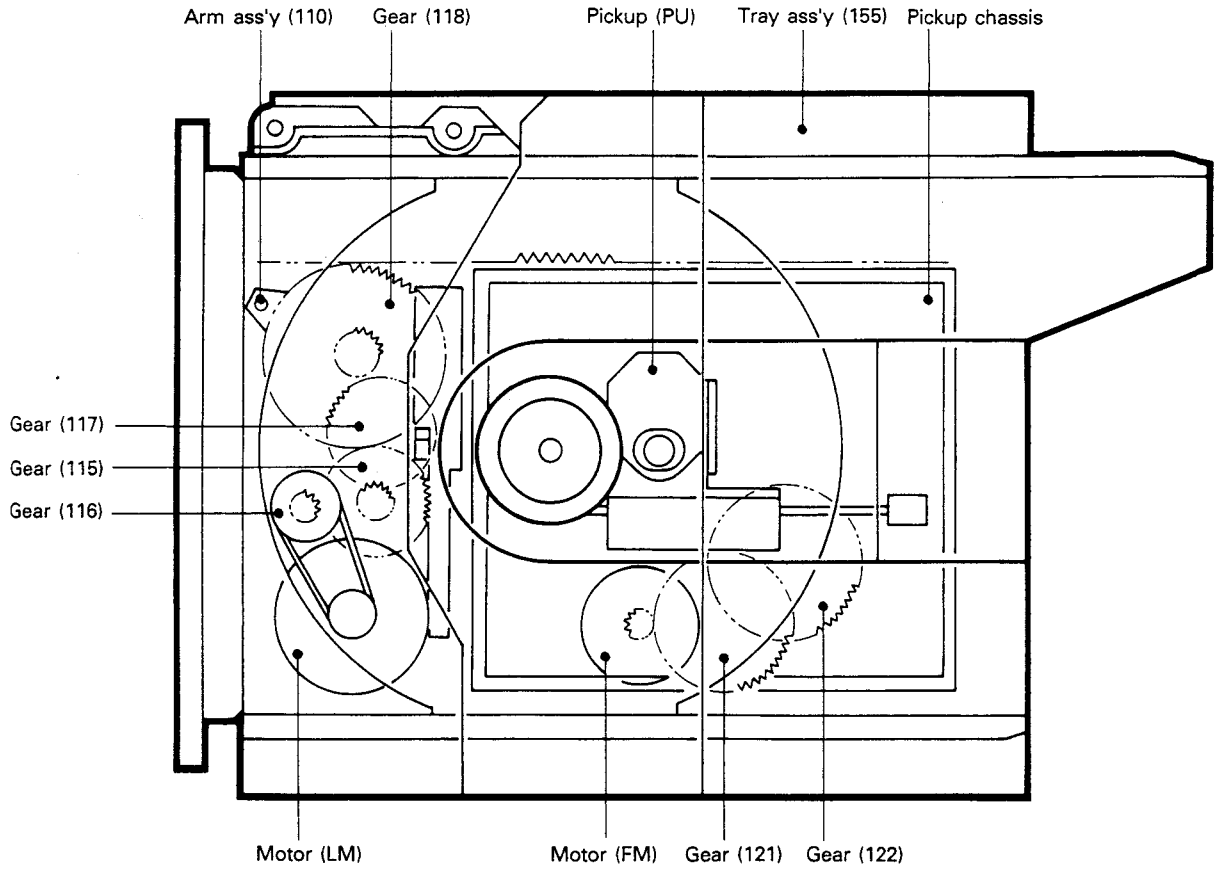


Fig.1

DP-7050

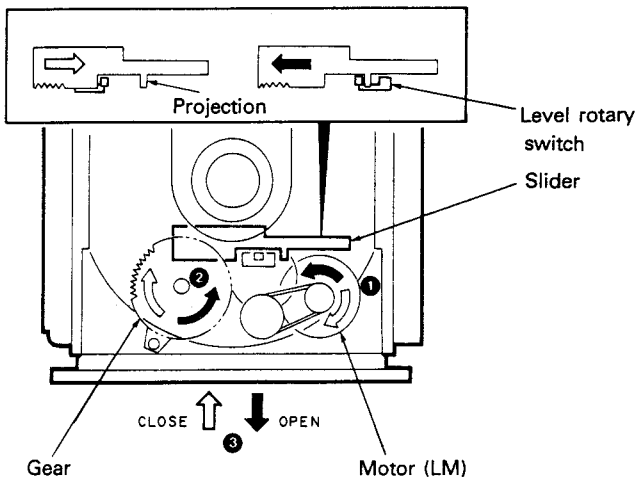
MECHANISM OPERATION DESCRIPTION

MECHANISM OPERATION

1. OPEN/CLOSE FUNCTION

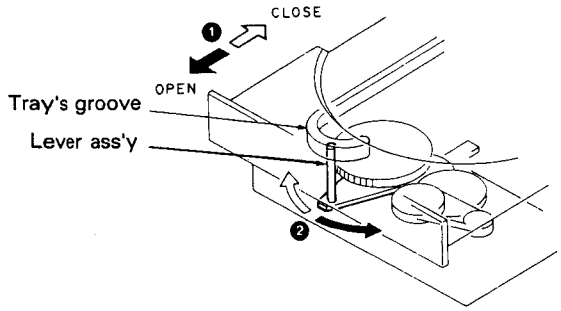
By the rotaion of the loading motor (❶) ,Gear (❷). isrotate and the tray starts OPEN/CLOSE operation (❸).

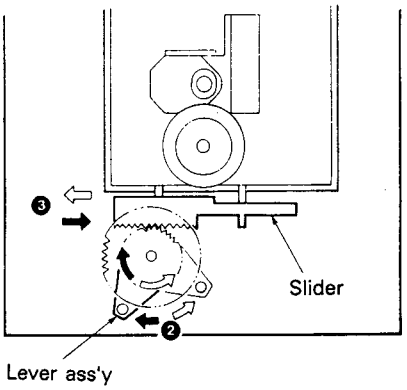
The OPEN/CLOSE operation stops when the projection of the slider comes in contact with the detection switch (❹).



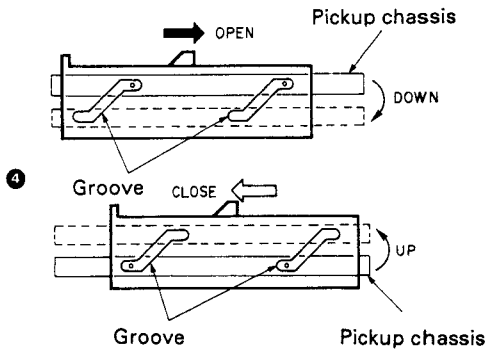
2. PICKUP CHASSIS TRAVELING

According to tray's OPEN/CLOSE operation (❶). the shaft of lever moves (❷).
And then slider travels by the lever with gear (❸).





Along with the grooves in the lever, the pickup cahassis moves up and down (❹).

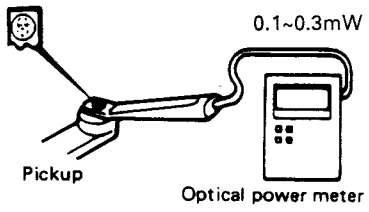


ADJUSTMENT

No.	ITEM	INPUT SETTING	OUTPUT SETTING	PLAYER SETTING	ALIGNMENT POINT	ALIGN FOR	FIG
1	LASER POWER	-	Set the sesor section of the optical power meter on the pickup lens.	Short-circuit pins TEST and turn the power on to enter the test mode. Press the "DISPLAY MODE" key to check that the display is "03".	-	On the power from 0.1 to 0.3mW, when the diffraction grating is correctly aligned with the RF level of 1.0Vp-p or more	(a)
2	TRACKING ERROR BALANCE	Test disc Type 4	Connect an oscilloscope as follows. CH1: RF (CN4-1) CH2: TE (CN4-6)	Load disc and set to test mode. Confirm the display is "03".	TE BALANCE VR104	Symmetry between upper and lower or DC=0±0.05V	(c)
3	FOCUS ERROR BALANCE	Test disc Type 4	Connect an oscilloscope as follows. CH1: RF(CN4-1) CH2: TE(CN4-6)	Press the PLAY key. Confirm that the display is " 05 ".	FE BALANCE VR103	Optimum eye pattern	(d)
4	FOCUS GAIN	Test disc Type 4 Apply signal of 1.0kHz,100mVrms to CN4 pin 2-3.	Connect a LPF to CN4 pin 2-3 to which connect an oscilloscope or AC voltmeters.	Press the PLAY key. Confirm that the display is " 05 ".	FOCUS GAIN VR101	Two VTVMs should read the same value.	(e)
5	TRACKING GAIN	Test disc Type 4 Apply signal of 1.0kHz,100mVrms to CN4 pin 5-6.	Connect a LPF to CN4 pin 5-6 to which connect an oscilloscope or AC voltmeters.	Press the PLAY key. Confirm that the display is " 05 " .	TRACKING GAIN VR102	Two VTVMs should read the same value.	(e)

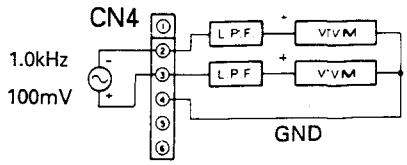
(Note) Type 4 disc: SONY YDS-18 Test Disc or equivalent.
LPF: Around 47kohms+390pF or so.
Step 1~5 are in Test Mode.

(a) Laser Power

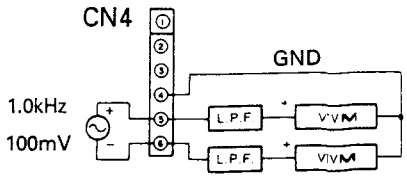


(e) Focus Gain and Tracking Gain Adj.

Focus gain Adj.



Tracking gain Adj.



REGLAGE

No.	ELEMENT	REGLAGE D'ENTREE	REGLAGE DE SORTIE	REGLAGE DU LECTEUR	POINT D'ALIGNEMENT	ALIGNEMENT POUR	FIG.
1	PUISSANCE LASER	–	Placer la section détecteur de l' indicateur de puissance optique sur l' objectif du capteur.	Court-circuiter les broches TEST et mettre sous tension pour passer dans le mode d' essai. Appuyer sur la touche "DISPLAY MODE" pour vérifier que l' affichage indique " 03 ".	–	Puissance de 0,1 à 0,3mW lorsque le sélecteur de mode de diffraction est correctement aligné avec un niveau RF de 1,0Vc-c ou plus.	(a)
2	BALANCE D' ERREUR D' ALIGNEMENT	Disque test type 4	Raccorder un oscilloscope comme suit. CH1 : RF (CN4-1) CH2 : TE (CN4-6)	Charger un disque et régler dans le mode d' essai. Confirmer que l' affichage indique " 03 ".	TE BALANCE VR104	Symétrie entre les formes supérieure et inférieure ou DC=0±0,05V	(c)
3	BALANCE D' ERREUR DE FOCALISATION	Disque test type 4	Raccorder un oscilloscope comme suit. CH1 : RF (CN4-1) CH2 : TE (CN4-6)	Presser la touche PLAY. S' assurer que l' affichage est " 05 "	FE BALANCE VR103	Forme optimum	(d)
4	GAIN DE MISE AU POINT	Disque test type 4 Appliquer un signal de 1,0kHz, 100mVrms à CN4 broche 2-3.	Connecter un filtre pass-bas à CN4 broche 2-3 et raccorder un oscilloscop ou un voltmétre CA.	Presser la touche PLAY. S' assurer que l' affichange est " 05 ".	GAIN DE MISE AU POINT VR101	Deux voltmétres doivent indiquer la même valeur.	(e)
5	GAIN D'ALIGNEMENT	Disque test type 4 Appliquer un signal de 1,0kHz, 100mVrms à CN4 broche 5-6.	Connecter un filtre pass-bas à CN4 broche 5-6 et raccorder un oscilloscop ou un voltmétre CA.	Presser la touche PLAY. S' assurer que l' affichange est " 05 ".	GAIN DE MISE AU POINT VR102	Deux voltmétres doivent indiquer la même valeur.	(e)

(Note) Disque type 4 : Disque d'essai YDS-18 SONY ou équivalent.

LPF (filtre passe-bas) : Autour de 47kohms+390pF.

Les étapes 1~5 se font dans le mode d' essai.

ABGLEICH

Nr.	EINSTELLGRÖSSE	EINGANGSEIN STELLUNG	AUSGANGSEIN STELLUNG	SPIELER-BETRIEBSART	EINSTELLPUNKT	EINSTELLVORGANG	Abb.
1	LASERLEISTUNG	–	Den Sensorteil des optischen Leistungsmessers auf die Pickup-Linse einstellen.	Die Stifte TEST kurzschließen, das Gerät einschalten und auf Testbetrieb stellen. Die "DISPLAY MODE" -Taste drücken und sicherstellen, daß die Anzeige " 03 " erscheint.	–	Auf 0,1 bis 0,3mW justieren, wenn das Beugungsgitter korrekt auf den HF-Pegel von 1,0Vs-s oder mehr ausgerichtet ist.	(a)
2	TRACKING-FEHLER BALANCE	Testdisc Typ 4	Ein Oszilloscop wie folgt anschließen : Kanal 1 : RF (CN4-1) Kanal 2 : TE (CN4-6)	Die Disc einlegen, und auf Testbetrieb schalten. Sicherstellen, daß die Anzeige " 03 " erscheint.	TE BALANCE VR104	Symmetrie zwischen oberen und umteren Mustern oder Gleichstrom DC=0±0,05V	(c)
3	FOKUS-FEHLER BALANCE	Testdisc Typ 4	Ein Oszilloskop wie folgt anschließen : Kanal 1 : RF (CN4-1) Kanal 2 : TE (CN4-6)	Die PLAY-Taste drücken und sicherstellen, daß " 05 " angezeigt wird.	FE BALANCE VR103	Optimales Augenmuster	(d)
4	FOKUSVERSTÄRKUNG	Testdisc Typ 4 Ein Signal von 1,0kHz, 100mVrms an CN4 Stift 2-3 anlegen.	Ein Tiefpaßfilter an CN4 Stift 2-3 und an dieses ein Oszilloskop oder Wechselstrom voltmeter anschließen.	Die PLAY-Taste drücken und sicherstellen, daß " 05 " angezeigt wird.	FOCUS GAIN VR101	Zwei VTVM müssen den Gleichen Wert zeigen.	(e)
5	SPURHALTE-VERSTÄRKUNG	Testdisc Typ 4 Ein Signal von 1,0kHz, 100mVrms an CN4 Stift 5-6 anlegen.	Ein Tiefpaßfilter an CN4 Stift 5-6 und an dieses ein Oszilloskop oder Wechselstrom voltmeter anschließen.	Die PLAY-Taste drücken und sicherstellen, daß " 05 " angezeigt wird.	TRACKING GAIN VR102	Zwei VTVM müssen den Gleichen Wert zeigen.	(e)

Zur Beachtung

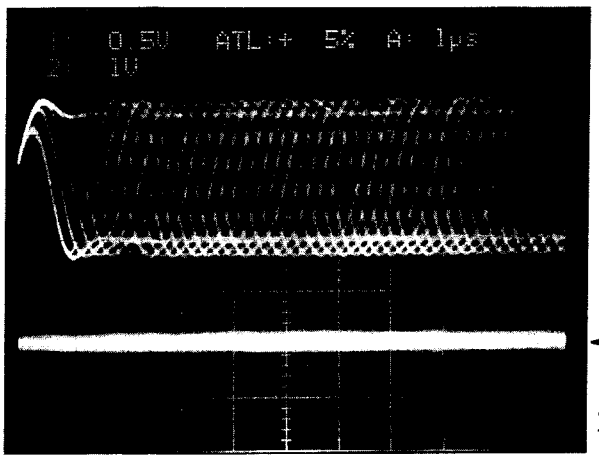
Disc Typ 4 : Test-Disc SONY YDS-18 oder gleichwertig.

Tiefpaßfilter : ca. 47kΩ+390pF

Schritte 1-5 erfolgen im Testbetrieb.

DP-7050

ADJUSTMENT/ REGLAGE / ABGLEICH

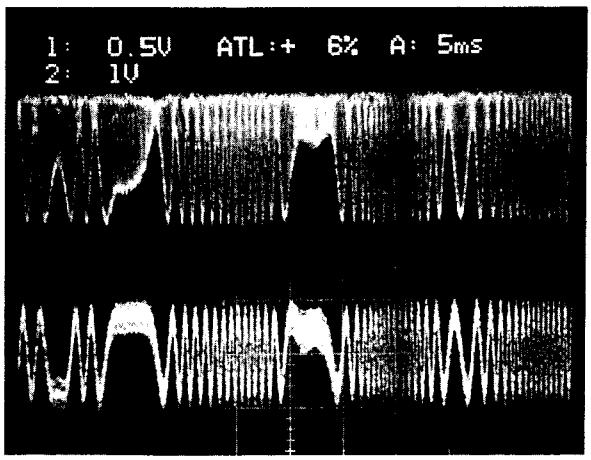


CH1
RF signal
: AC coupled

←0(V)

CH2
TE signal
: DC coupled

- RF signal and E.Spot signal in test mode (PLAY).
- Signal RF et signal E.Spot en mode de test (PLAY).
- RF-Signal und E.Spot-Signal im Testmodus (PLAY).

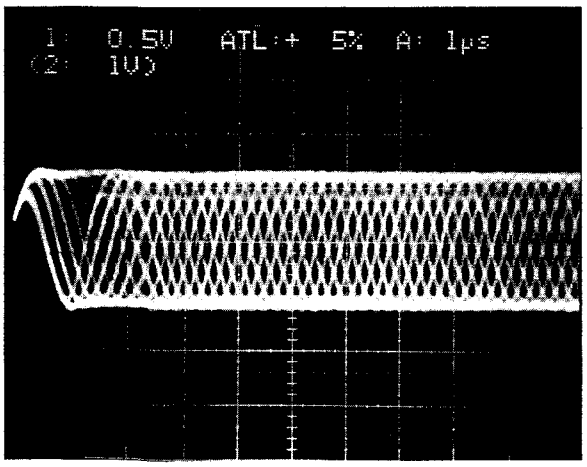


CH1
RF signal

←0(V)

CH2
TE signal
: DC coupled

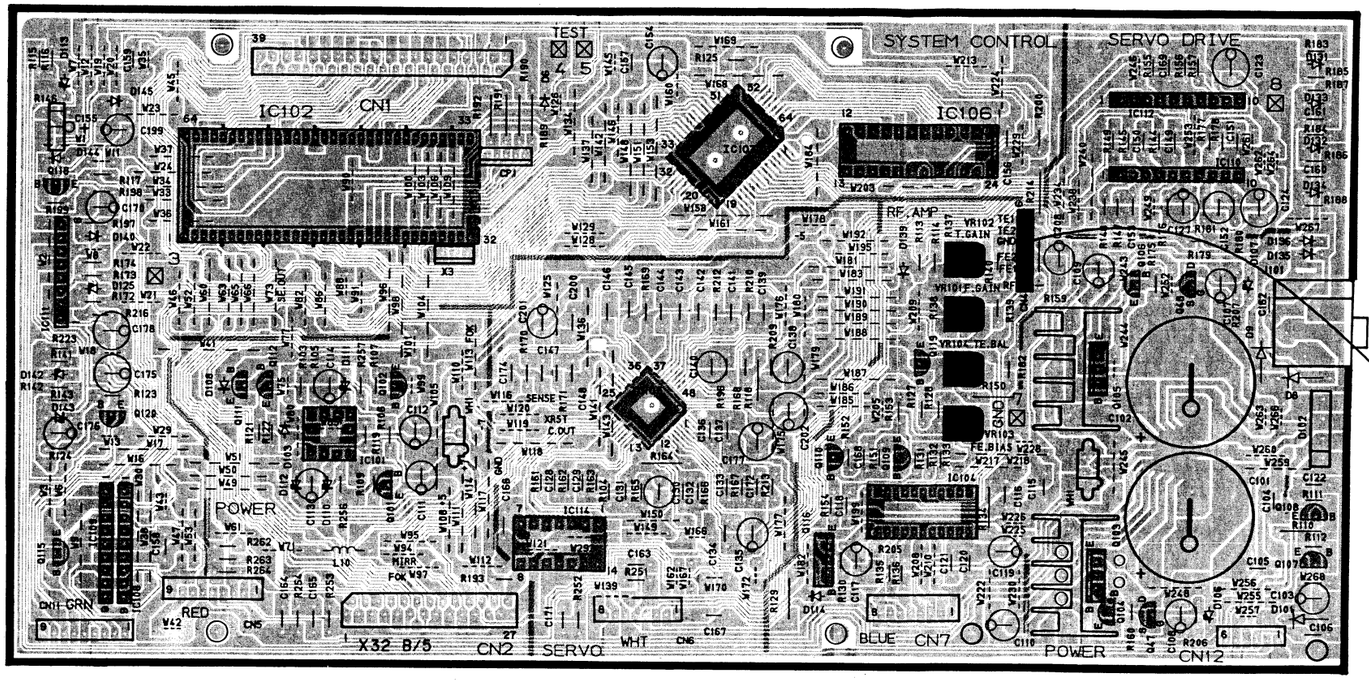
- RF signal and T.Error signal; in test mode (Focusing ON). (Disc type 4)
- Adjust T.Error so that the waveform is symmetrical above and below 0V. (VR104)
- Signal RF et signal T.Error; en mode test (mise au point ON). (Disque de type 4)
- Ajuster T.Error pour que la forme d'onde soit symétrique en-dessus et au-dessous de 0V. (VR104)
- RF-Signal und T.Error-Signal; im Testmodus (Fokussierung eingeschaltet). (Disc Typ 4)
- T.Error so einstellen, daß die Wellenform über und unter 0V symmetrisch ist. (VR104)



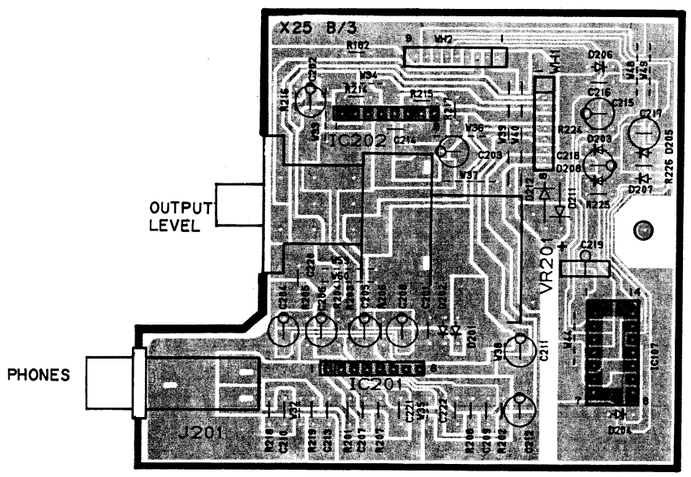
RF signal
: AC coupled

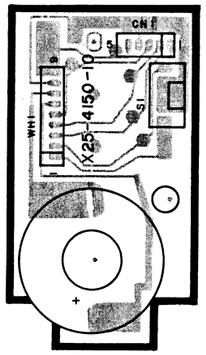
- RF signal in test mode (PLAY).
- Perform the tangential and focusing offset adjustments so that each of the center cross points are focused into one point on the display. The crossing points above and below the center shall also be displayed clearly.
- Signal RF en mode de test (PLAY).
- Effectuer les adjustments d'offset tangentiel et de mise au point pour que chacun des points de croisement central soit mis au point sur un point de l'affichage. Les points de croisement au-dessus et en-dessous du centre doivent aussi être affichés clairement.
- RF-Signal im Testmodus (PLAY).
- Die Tangential und Fokusversatz-Einstellungen so durchführen daß jeder der mittleren Kreuzungspunkte in einem Punkt auf dem Display fokussiert wird. Auch die Krezungspunkte über und unter der Mitte müssen klar angezeigt werden.

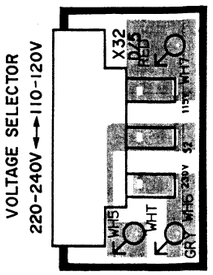
PC BOARD (COMPONENT SIDE VIEW)

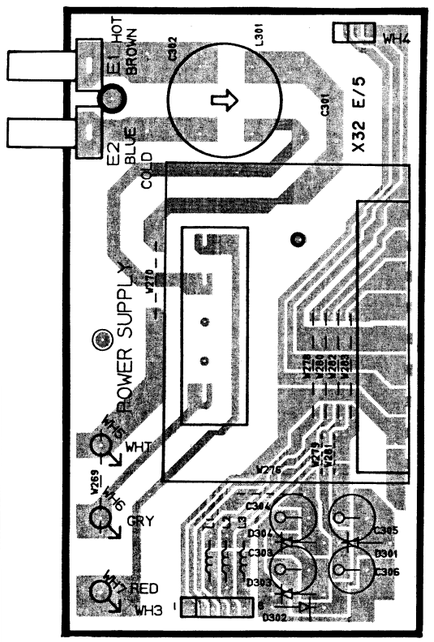


SYSTEM CONTROL



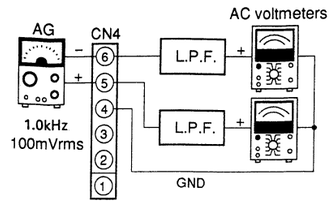




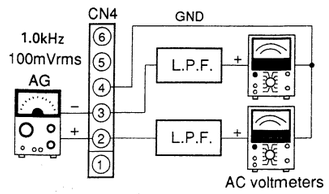


Refer to the schematic diagram for the values of resistors and capacitors.

(e) Tracking gain.
Two VTVMs should read the same value.

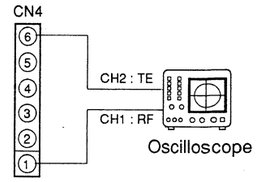


(e) Focus gain.
Two VTVMs should read the same value.

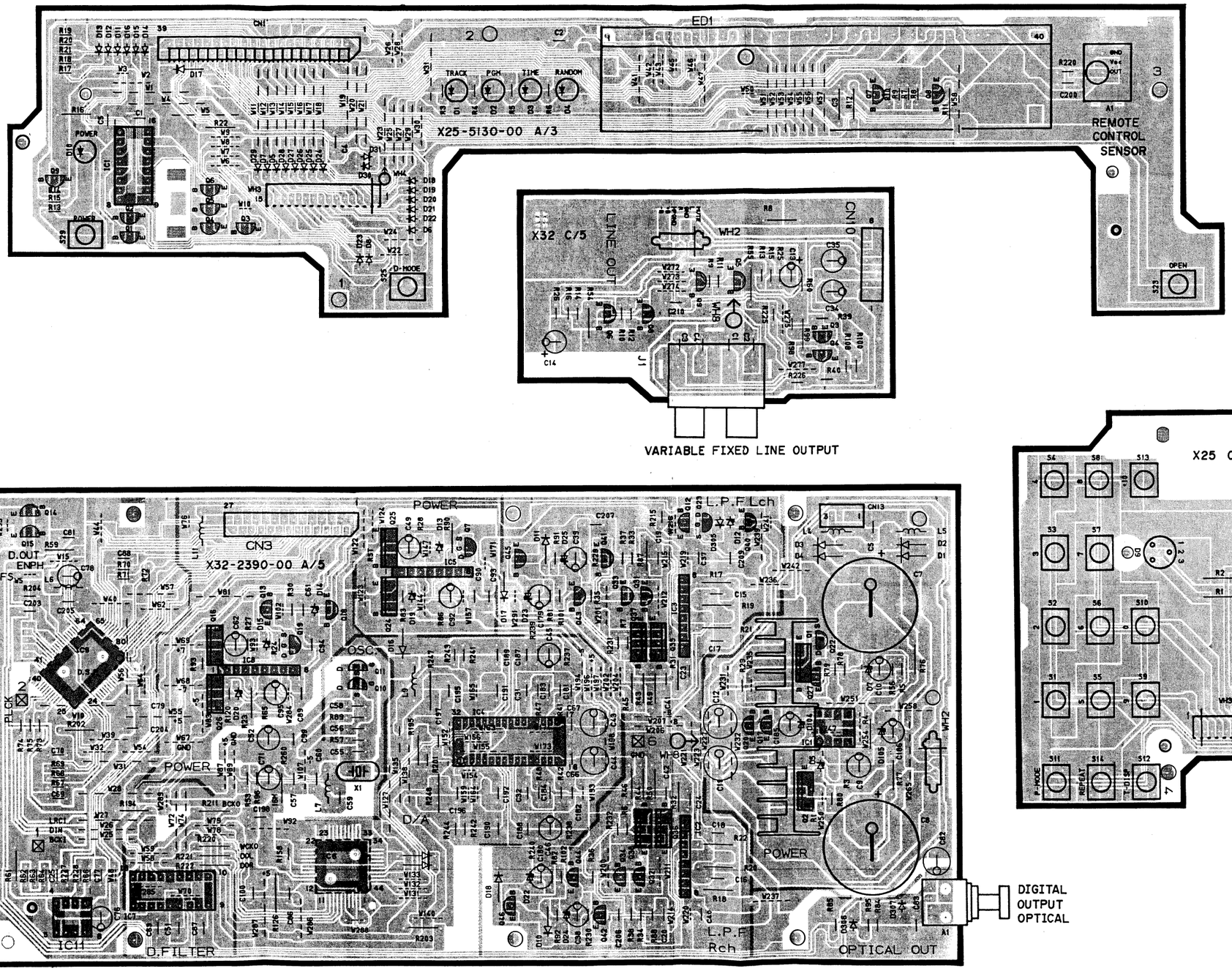


(c) Tracking error — Symmetry between upper and lower or DC=0±0.05V

(d) Focus error — Optimum eye pattern.



PC BOARD (COMPONENT SIDE VIEW)



Refer to the schematic diagram for the values of resistors and capacitors.

MECHA. ASS'Y (CDM-19)
(X92-1600-51) SINGAPORE MADE
(X92-1590-51) FRANCE MADE

CD PLAYER UNIT
(X32-240)(B/5) SINGAPORE MADE
(X32-250)(B/5) FRANCE MADE

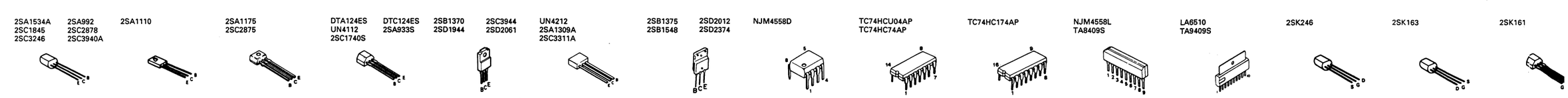
(X25-4150-21)

KSS-210A

(X32-) (B/5) (E/5)

IC101	: NJM4558D
IC102	: μPD75216ACW-W35
IC103	: CXD1095Q
IC104	: CXA1571S
IC105	: CXA1372Q
IC106	: LC3518BSL-15
IC108,109	: TA8409S
IC110,112	: TA8410AK or LA6510
IC111	: BA10393N
IC114	: TC74HCU04AP
Q47,48	: 2SK246(Y,GR)
Q101	: 2SC3246(H,J)
Q102,120	: 2SC3940A(R,S)
Q103	: 2SB1375 or 2SB1548 or 2SB1370
Q104,118	: 2SC1740S(Q,R) or 2SC2785(F,E)
Q105	: 2SD2012 or 2SD2374 or 2SD2061
Q106,108	: 2SA1175(F,E) or 2SA933S(Q,R)
Q107	: 2SA1534A
Q109	: 2SC3311A(Q,R)
Q110	: 2SA1309A(Q,R)
Q111	: UN4112 or DTA124ES
Q112,115,119	: UN4212 or DTC124ES
Q116	: 2SA1110(R,S)
D6,103,108,114,131~136,139,140,144,145	: 1SS133 or HSS104
D8,9	: SD103A
D101,301~304	: 1SR139-100 or S5688B
D102	: 1B4B41
D103,108,114,131~136,139,140,144,145,201~208	: 1SS133 or HSS104
D106,107,113	: RD7.5JS(B) or HZS7.5S(B)
D110~112	: RD5.1JS(B2) or HZS5.1S(B2)
D125,142	: RD3.9ES(B2) or HZS3.9N(B2)
D143	: RD6.2ES(B2) or HZS6.2N(B2)

2SA1534A 2SC1845 2SC3246 | 2SA992 2SC2878 2SC3940A | 2SA1110 | 2SA1175 2SC2875 | DTA124ES UN4112 2SC1740S | DTC124ES 2SA933S | 2SB1370 2SD1944 | 2SC3944 2SD2061 | UN4212 2SA1309A 2SC3311A | 2SB1375 2SB1548 | 2SD2012 2SD2374 | NJM4558D | TC74HCU04AP TC74HC74AP | TC74HC174AP | NJM4558L TA8409S | LA6510 TA9409S | 2SK246 | 2SK163 | 2SK161



PRODUCT P.	DESTINATION		UNIT NAME	C115.116	C177.202	(X32-)(D/5)	W269
	COUNTRY	ABB					
SINGAPORE MADE	EUROPE AUSTRALIA	E X	X32-2402-70	33μ16	YES	NO	YES
	U.K	T	X32-2400-51	0.33	NO	NO	YES
	GENERAL MARKET	M	X32-2400-21	33μ16	NO	YES	NO
FRANCE MADE	EUROPE	E	X32-2502-70	33μ16	YES	NO	YES
	U.K	T	X32-2500-51	0.33	NO	NO	YES

(E) AC220V 50Hz
(X,T) AC240V 50Hz
(M) AC110-120V/220-240V 50/60Hz

(X25-5142-70)(B/3) SINGAPORE MADE (X25-5312-70)(B/3) FRANCE MADE

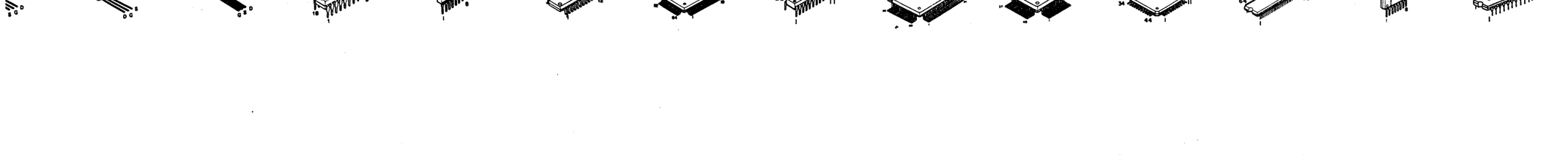
(X25-)(B/3)
D201~208 : HSS104 or 1SS133
D211,212 : S5688B or 1SR139-100

IC107 : TC74HC74AP
IC201,202 : NJM4565L

SIGNAL LINE
GND LINE
+B LINE
-B LINE

DP-7050(K)(1/2)

2SK163 2SK161 SM5840CP BA10393N LC3518BSL-15 CXD1095Q CXA1571S CXD2500BQ CXA1372Q SAA7350 UPD75216ACW-W35 NJM4565L TDA1547



PRODUCT P.	DESTINATION		UNIT NAME	C115.116	C177.202	(X32-)(D/5)	W269
	COUNTRY	ABB					
SINGAPORE MADE	EUROPE	E	X32-2402-70	33μ16	YES	NO	YES
	AUSTRALIA	X					
	U.K	T	X32-2400-51	0.33	NO	NO	YES
	GENERAL MARKET	M	X32-2400-21	33μ16	NO	YES	NO
FRANCE MADE	EUROPE	E	X32-2502-70	33μ16	YES	NO	YES
	U.K	T	X32-2500-51	0.33	NO	NO	YES

(X25-5142-70)(B/3) SINGAPORE MADE (X25-5312-70)(B/3) FRANCE MADE

(X25-)(B/3)
D201~208 : HSS104 or 1SS133
D211,212 : S5688B or 1SR139-100

IC107 : TC74HC74AP
IC201,202 : NJM4565L

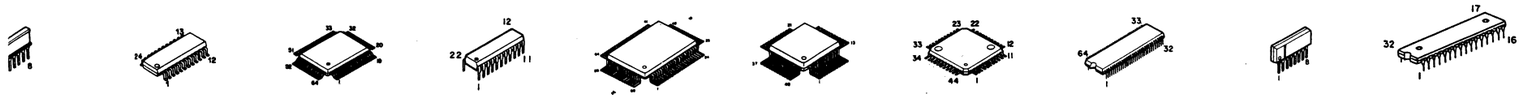
SIGNAL LINE
GND LINE
+B LINE
−B LINE

DP-7050(K)(1/2)

- DC voltages are as measured with a high impedance voltmeter. Values may vary slightly due to variations between individual instruments or/and units.
- Les tensions c.c. doivent être mesurées avec un voltmètre à haute impédance. Les valeurs peuvent différer légèrement du fait des variations inhérentes aux appareils et aux instruments de mesure individuels.
- Die angegebenen Gleichspannungswerte wurden mit einem hochohmigen Voltmeter gemessen. Dabei schwanken die Meßwerte aufgrund von Unterschieden zwischen einzelnen instrumenten oder Geräten u.U. geringfügig.

CAUTION : For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list). ⚠ Indicates safety critical components. To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably insulated from the supply circuit) before the appliance is returned to the customer. DOLBY and the double-D symbol are tradmarks of Dolby Laboratories Licensing Corporation. Noise reduction circuit made under license from Dolby Laboratories Licensing Corporation.

LC35188SL-15 CXD1095Q CXA1571S CXD2500BQ CXA1372Q SAA7350 UPD75216ACW-W35 NJM4565L TDA1547



Y22-3182-70

DP-7050
KENWOOD

CD PLAYER UNIT
(X32-)(A/5)

(X25)(B/3) WHI
(X32)(B/5) CN2
(X32)(E/5) WH4
(X32)(B/5) CN1

CN3 MUTG VSS XRST SYS.RST NC SCOR SQSO SQCK SENS DATA MUTE XLT CLK C.IN DATO XLTO CLKO MIRR FOK LOCK SEIN CLV +B -B GND EFM GND

IC9 (BOTTOM VIEW)
DIGITAL SIGNAL PROCESSOR

IC6 (BOTTOM VIEW)
20bit INPUT BITSTREAM CONVERSION DAC

IC7
DIGITAL FILTER

IC4
BITSTREAM DAC (1bit)

IC5 (1/2) +5V AVR
IC8 (2/2) ±5V AVR SW
IC5 (2/2) -5V AVR
IC3 (2/2)
IC3 (1/2) OUTPUT AMP
IC2 (1/2)
IC2 (2/2)
IC1 (2/2)
IC1 (1/2)
IC8 (1/2)
IC11 (2/2) CLV AMP

MUTE DRIVER
CASCADE AMP
LPF
OPTICAL DIGITAL OUT BUFFER
MASTER CLOCK OSC
MASTER CLOCK
DAC +13V AVR
±13V AVRSW
DAC -13V AVR
-5V AVR

Q1 Q2 Q10 Q11 Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q22 Q23 Q24 Q25 Q26 Q27 Q31 Q32 Q33 Q34 Q35 Q36 Q37 Q38 Q40 Q41 Q42 Q43 Q44 Q45 Q46 Q7

D1 D2 D3 D4 D5 D7 D10 D11 D12 D13 D14 D15 D16 D17 D18 D19 D20 D22 D23 D24 D25 D26 D27 D28 D104 D105 D305 D306 D307

CN13 AC GND AC

OPT DIGITAL OUT

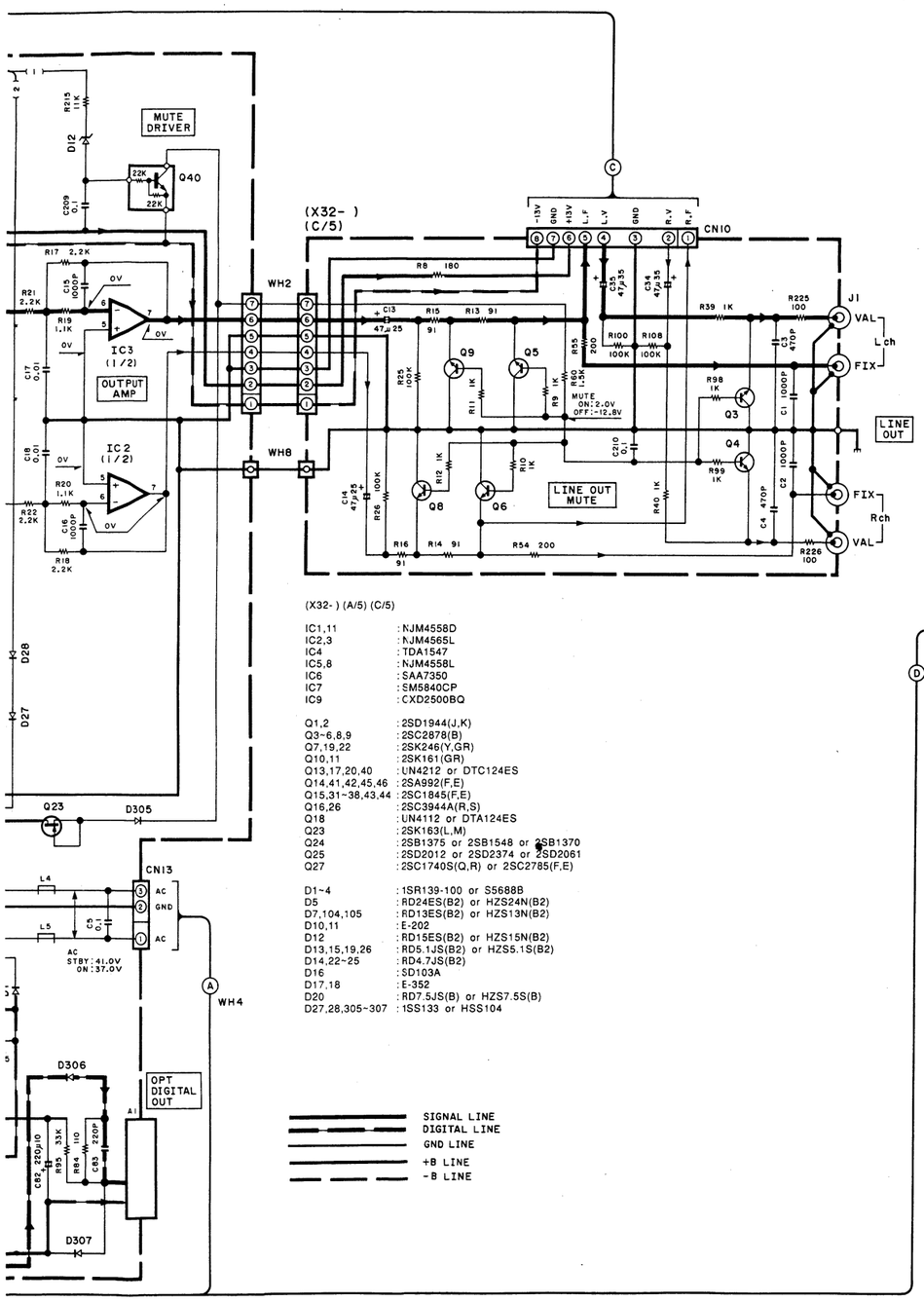
EMP ON:H OFF:L

(a) Q14, 15 Emitter : DC coupled
← DATA : 1kHz, 0dB signal

(b) IC9 (Pin80) : DC coupled
← MIRR : During search

(c) IC7 (Pin18) : AC coupled
← DIN

(d) IC7 (Pin17) : AC coupled
← BCKI

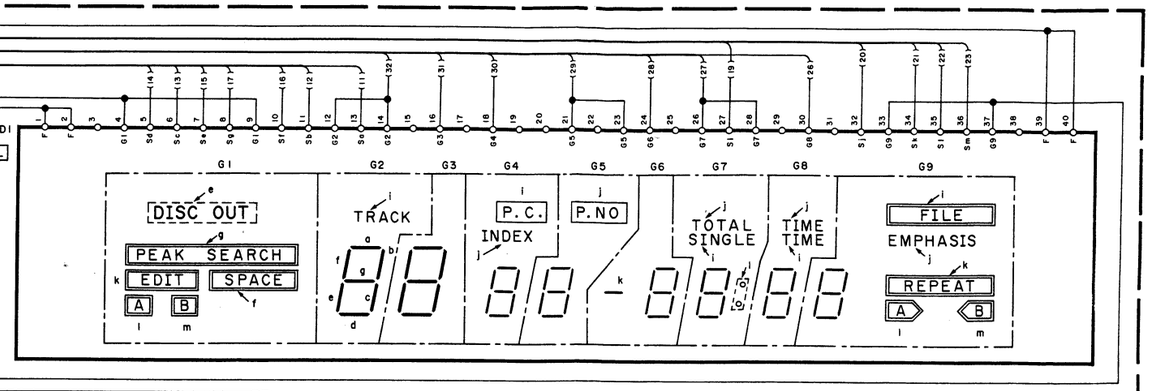


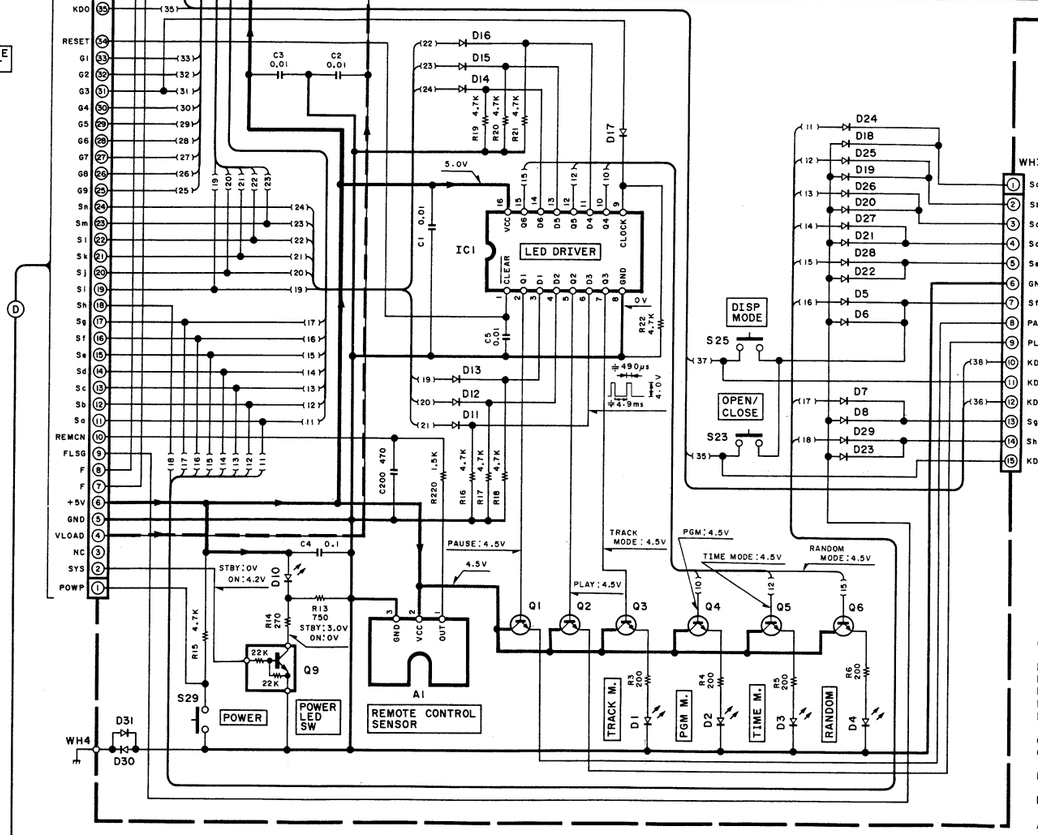
(X32-) (A/5) (C/5)

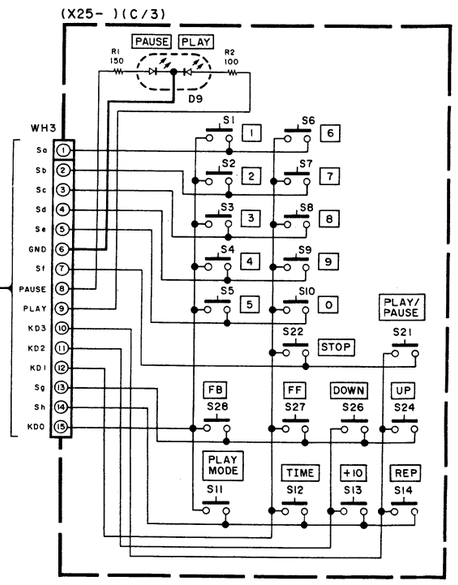
IC1,11	:NJM4558D
IC2,3	:NJM4565L
IC4	:TDA1547
IC5,8	:NJM4558L
IC6	:SAA7350
IC7	:SM5840CP
IC9	:CXD2500BQ
Q1,2	:2SD1944(J,K)
Q3~6,8,9	:2SC2878(B)
Q7,19,22	:2SK246(Y,GR)
Q10,11	:2SK161(GR)
Q13,17,20,40	:UN4212 or DTC124ES
Q14,41,42,45,46	:2SA992(F,E)
Q15,31~38,43,44	:2SC1845(F,E)
Q16,26	:2SC3944A(R,S)
Q18	:UN4112 or DTA124ES
Q23	:2SK163(L,M)
Q24	:2SB1375 or 2SB1548 or 2SB1370
Q25	:2SD2012 or 2SD2374 or 2SD2061
Q27	:2SC1740S(Q,R) or 2SC2785(F,E)
D1~4	:1SR139-100 or S5688B
D5	:RD24ES(B2) or HZS24N(B2)
D7,104,105	:RD13ES(B2) or HZS13N(B2)
D10,11	:E-202
D12	:RD15ES(B2) or HZS15N(B2)
D13,15,19,26	:RD5.1JS(B2) or HZS5.1S(B2)
D14,22~25	:RD4.7JS(B2)
D16	:SD103A
D17,18	:E-352
D20	:RD7.5JS(B) or HZS7.5S(B)
D27,28,305~307	:1SS133 or HSS104

SIGNAL LINE
DIGITAL LINE
GND LINE
+B LINE
-B LINE

DISPLAY UNIT (X25-) (A/3)



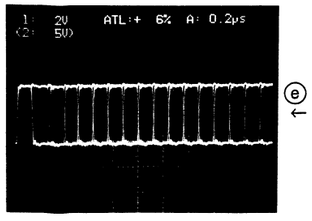




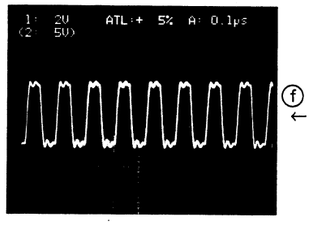
(X25-)(A/3)(C/3)

D1~4	:B30-1291-05
D5~8,11~29	:HSS104A or 1SS131
D9	:B30-1263-05
D10	:B30-1290-05
D30,31	:1SS133 or HSS104
Q1~8	:2SC1740S(Q,R) or 2SC2785(F,E)
Q9	:DTC124ES or UN4212
IC1	:TC74HC174AP
ED1	:CF1097C
A1	:W02-1129-05

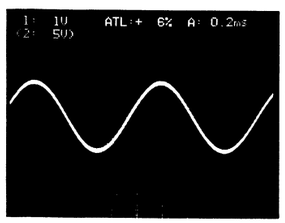
DP-7050(K)(2/2)



(e) IC4 (Pin3 or 30) : AC coupled
← INR or INL

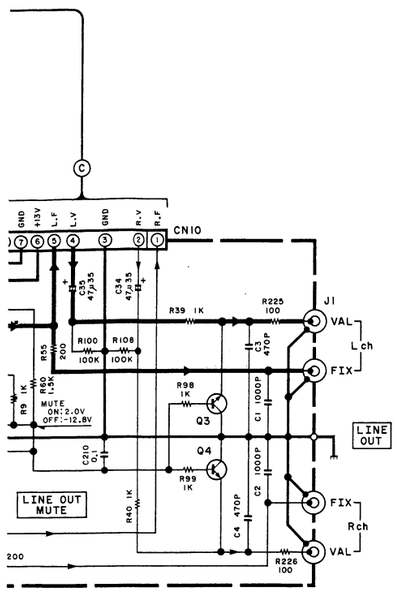


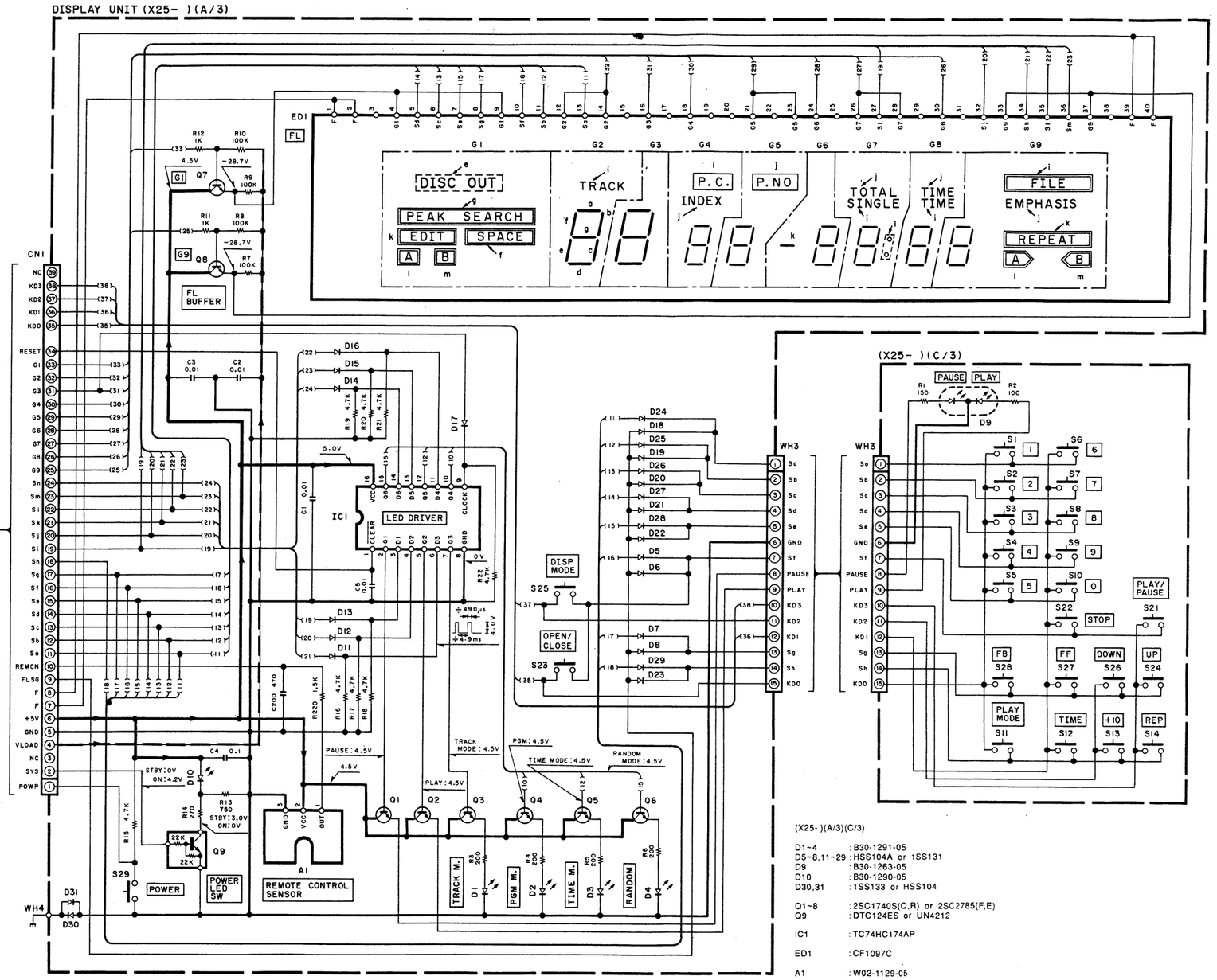
(f) IC4 (Pin5 or 28) : DC coupled
← CLKR or CLKL



(g) IC4 (Pin14 or 15) : AC coupled
← +OUTR, +OUTL : 1kHz, 0dB signal

Y22-3182-70





(X25-) (A/3) (C/3)

D1~4	: B30-1291-05
D5~8,11~29	: HSS104A or 1SS131
D9	: B30-1263-05
D10	: B30-1290-05
D30,31	: 1SS133 or HSS104
Q1~8	: 2SC1740S(Q,R) or 2SC2785(F,E)
Q9	: DTC124ES or UN4212
IC1	: TC74HC174AP
ED1	: CF1097C
A1	: W02-1129-05

DP-7050 (K) (2/2)

- Les tensions c.c. doivent être measurées avec un voltmètre à haute impédance. Les valeurs peuvent différer légèrement du fait des variations inhérentes aux appareils et aux instruments de mesure individuels.
- Die angegebenen Gleichspannungswerte wurden mit einem hochohmigen Voltmeter gemessen. Dabei schwanken die Meßwerte aufgrund von Unterschieden zwischen einzelnen instrumenten oder Geräten u.U. geringfügig.
- DC voltages are as measured with a high impedance voltmeter. Values may vary slightly due to variations between individual instruments or/and units.

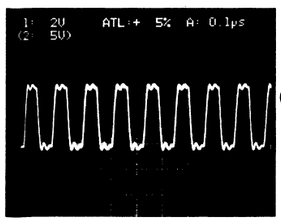
CAUTION : For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list). ⚠ Indicates safety critical components. To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably insulated from the supply circuit) before the appliance is returned to the customer.

2SB1370
2SD2061
85(F,E)

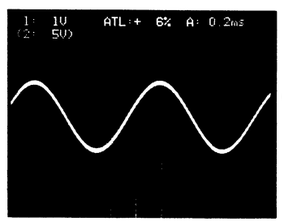
)2)
)2)

)2)
B2)

coupled



ⓕ IC4 (Pin5 or 28) : DC coupled
← CLKR or CLKL



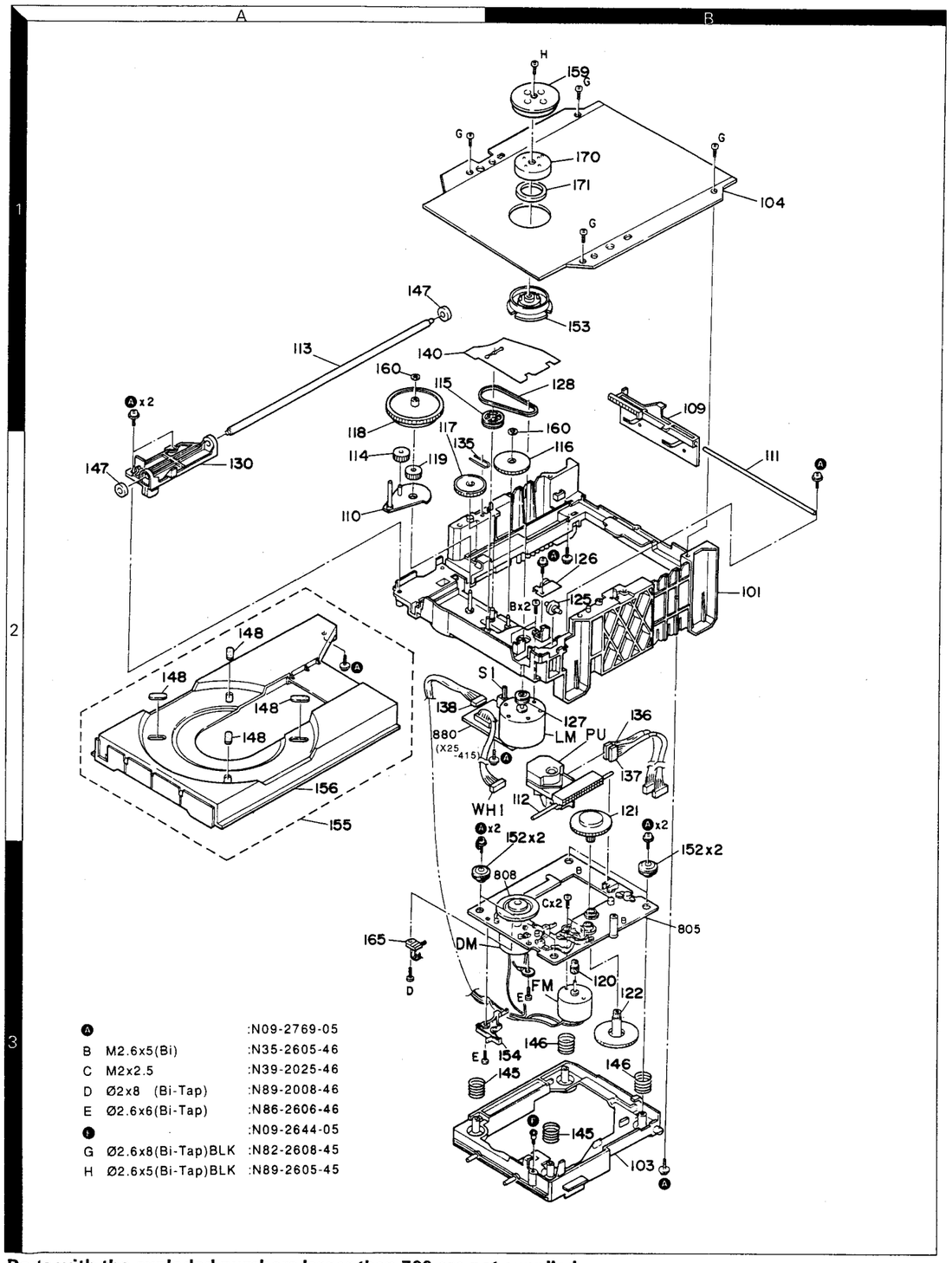
ⓖ IC4 (Pin14 or 15) : AC coupled
← +OUTR, +OUTL : 1kHz, 0dB signal

Y22-3182-70

DP-7050
KENWOOD

DP-7050

EXPLODED VIEW (MECHANISM) : SINGAPORE MADE

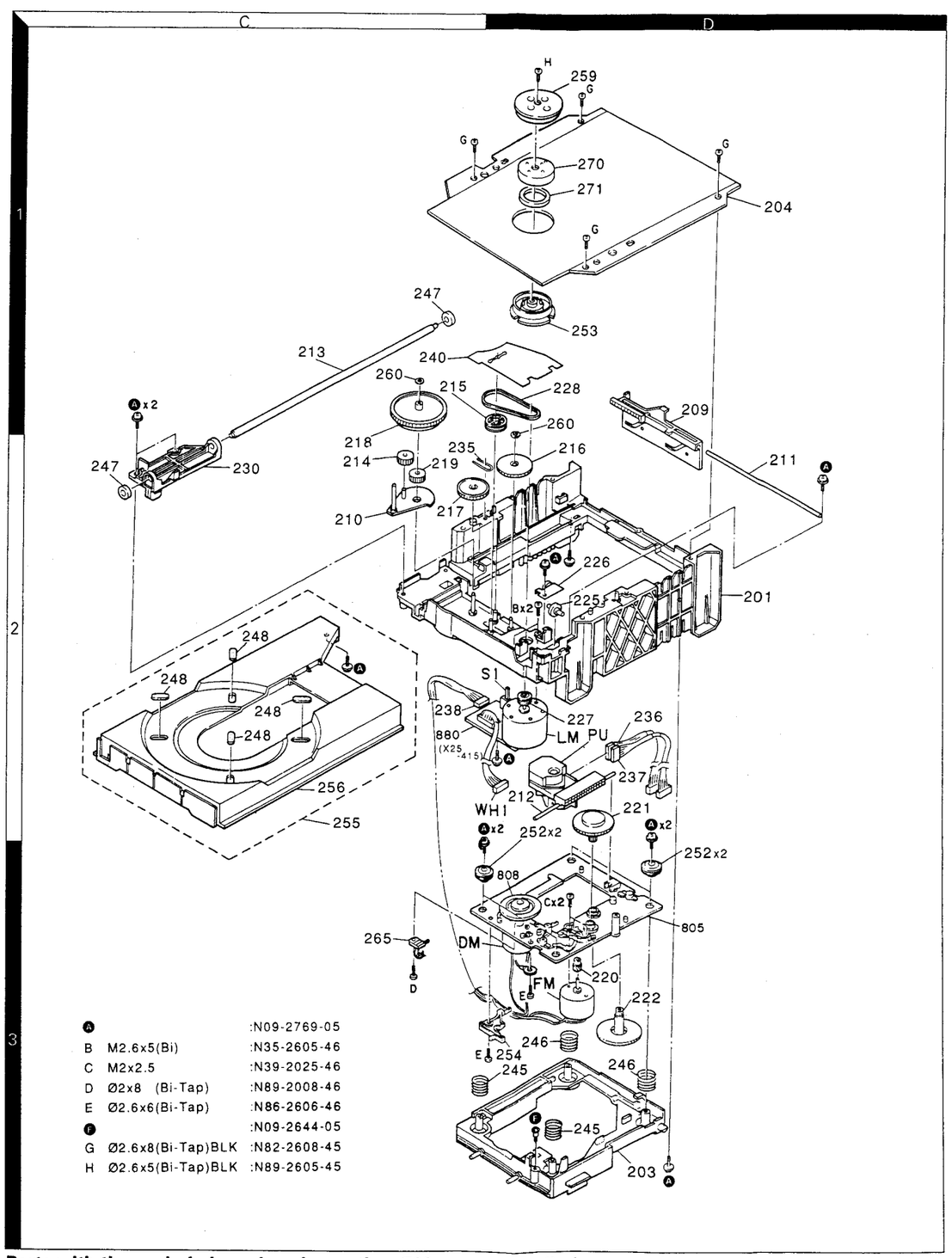


A		:N09-2769-05
B	M2.6x5(Bi)	:N35-2605-46
C	M2x2.5	:N39-2025-46
D	Ø2x8 (Bi-Tap)	:N89-2008-46
E	Ø2.6x6(Bi-Tap)	:N86-2606-46
F		:N09-2644-05
G	Ø2.6x8(Bi-Tap)BLK	:N82-2608-45
H	Ø2.6x5(Bi-Tap)BLK	:N89-2605-45

Parts with the exploded numbers larger than 700 are not supplied.

DP-7050

EXPLODED VIEW (MECHANISM) : FRANCE MADE

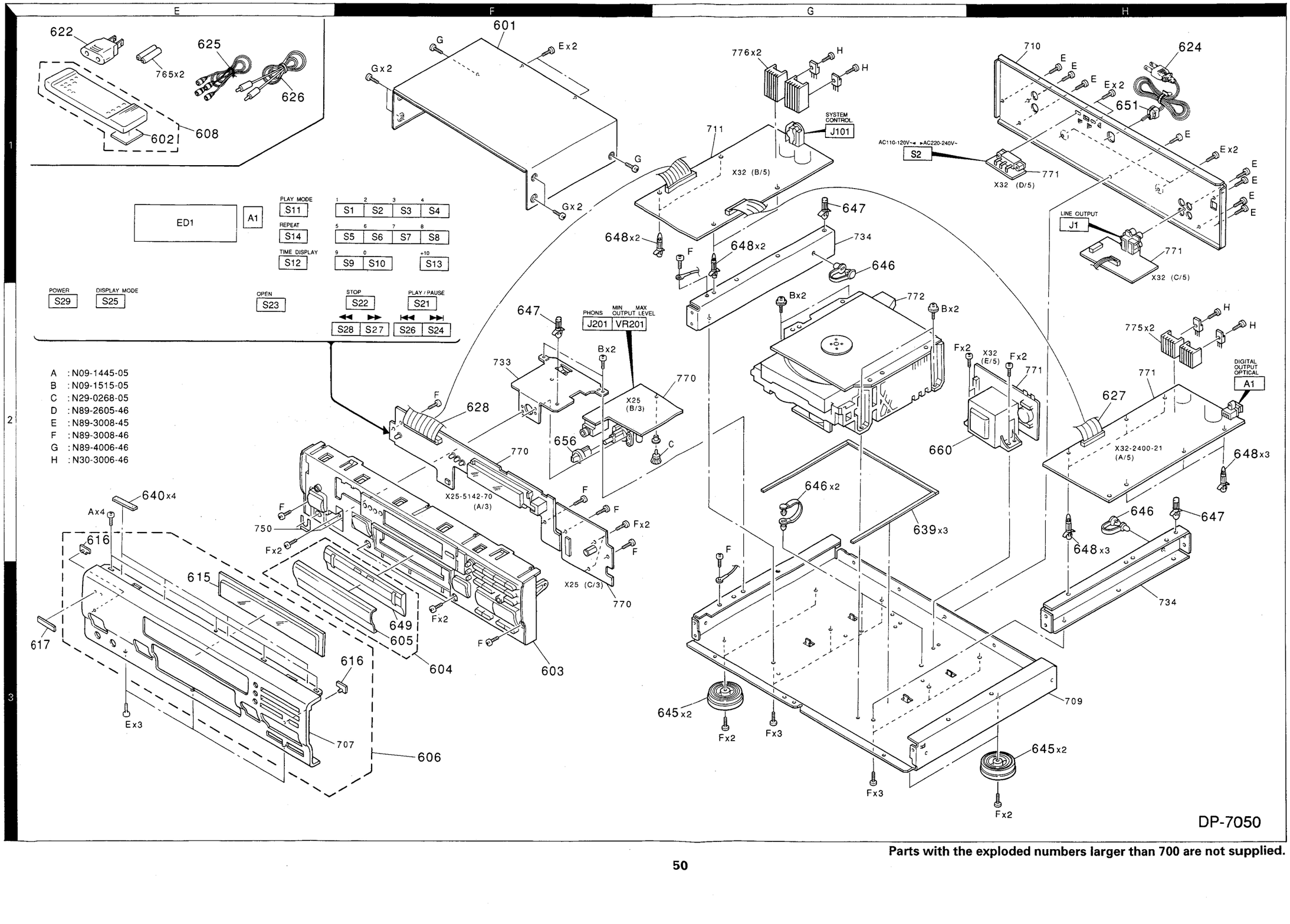


A		:N09-2769-05
B	M2.6x5(Bi)	:N35-2605-46
C	M2x2.5	:N39-2025-46
D	Ø2x8 (Bi-Tap)	:N89-2008-46
E	Ø2.6x6(Bi-Tap)	:N86-2606-46
F		:N09-2644-05
G	Ø2.6x8(Bi-Tap)BLK	:N82-2608-45
H	Ø2.6x5(Bi-Tap)BLK	:N89-2605-45

Parts with the exploded numbers larger than 700 are not supplied.

DP-7050 DP-7050

EXPLODED VIEW (UNIT)



DP-7050

Parts with the exploded numbers larger than 700 are not supplied.

PARTS LIST

* New Parts
Parts without **Parts No.** are not supplied.
Les articles non mentionnes dans le **Parts No.** ne sont pas fournis.
Teile ohne **Parts No.** werden nicht geliefert.

	Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
				DP-7050 (SINGAPORE MADE)			
	601	1F	*	A01-1765-01	METALLIC CABINET		
	602	1E		A09-0078-08	BATTERY COVER		
	603	3F	*	A22-1600-11	SUB PANEL		S
	604	3F	*	A29-0338-14	PANEL ASSY(TRAY)		
	605	3F	*	A29-0339-03	PANEL(TRAY)		
	606	3F	*	A60-0318-12	PANEL ASSY(FRONT)		
	608	1E	*	A70-0921-05	REMOTE CONTROLLER ASSY		
	615	3E	*	B10-1948-03	FRONT GLASS		
	616	2E,3F	*	B12-0219-04	INDICATOR		
	617	3E		B43-0287-04	KENWOOD BADGE		
	-			B46-0096-33	WARRANTY CARD	X	
	-			B46-0122-23	WARRANTY CARD	E	
	-			B46-0143-13	WARRANTY CARD	T	
	-		*	B58-0945-03	CAUTION CARD	T	
	-		*	B60-1038-00	INSTRUCTION MANUAL(ENGLISH)		S
	-		*	B60-1040-00	INSTRUCTION MANUAL(F,G,D,I)	E	S
	-		*	B60-1041-00	INSTRUCTION MANUAL(SPANISH)	EM	S
	-		*	B60-1042-00	INSTRUCTION MANUAL(CHINESE)	M	S
⚠	622	1E		E03-0115-05	AC PLUG ADAPTER	M	
⚠	624	1H		E30-0459-05	AC POWER CORD	EM	
⚠	624	1H		E30-2714-05	AC POWER CORD	X	
⚠	624	1H	*	E30-2718-05	AC POWER CORD	T	
	625	1E		E30-0505-05	AUDIO CORD		
	626	1E		E30-0977-05	CORD WITH PLUG(SYSTEM CONTROL)		
	627	2H		E35-0303-05	WIRING HARNESS		
	628	2F		E35-0304-05	WIRING HARNESS		
	639	2G	*	G10-0183-04	NON-WOVEN FABRIC		
	640	2E	*	G10-0185-04	NON-WOVEN FABRIC		
	-		*	H10-5218-12	POLYSTYRENE FOAMED FIXTURE(L)	EM	S
	-		*	H10-5219-12	POLYSTYRENE FOAMED FIXTURE(R)	EM	S
	-		*	H10-5405-02	POLYSTYRENE FOAMED FIXTURE(L)	XT	S
	-		*	H10-5406-02	POLYSTYRENE FOAMED FIXTURE(R)	XT	S
	-			H20-0554-04	PROTECTION COVER	M	
	-			H25-0232-04	PROTECTION BAG (235X350X0.03)	EMX	
	-			H25-0361-04	PROTECTION BAG	EX	
	-			H25-0651-04	PROTECTION BAG (0232 PRINTED)	T	
	-			H25-0666-04	PROTECTION BAG (0361 PRINTED)	T	
	-		*	H50-0499-04	ITEM CARTON CASE	E	S
	-		*	H50-0500-04	ITEM CARTON CASE	M	S
	-		*	H50-0589-04	ITEM CARTON CASE	XT	S
	645	3G,3H		J02-1072-05	FOOT		
	646	2G,2H		J11-0163-05	WIRE CLAMPER		
	647	1G,2H		J19-3300-05	UNIT HOLDER		
	648	1G,2H		J19-3325-05	UNIT HOLDER		
	649	3F	*	J19-3563-13	HOLDER		
⚠	651	1H		J42-0078-05	POWER CORD BUSHING		
	-			J61-0088-05	WIRE BAND		
	-			J61-0307-05	WIRE BAND	M	
	656	2F		K29-4031-04	KNOB(OUTPUT LEVEL)		

L:Scandinavia **K:**USA **P:**Canada
Y:PX(Far East, Hawaii) **T:**England **E:**Europe
Y:AAFES(Europe) **X:**Australia **M:**Other Areas

S : SINGAPORE MADE

⚠ indicates safety critical components.

DP-7050

PARTS LIST

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Teile ohne **Parts No.** werden nicht geliefert.

	Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
⚠	660	2G		L07-0418-05	POWER TRANSFORMER	M	
⚠	660	2G		L07-0419-05	POWER TRANSFORMER	EXT	
	A	2E		N09-1445-05	SET SCREW (M3X8)		
	B	2G		N09-1515-05	TAPPING SCREW (3X8)		
	C	2G		N29-0268-05	PUSH RIVET		
	D	3F		N89-2605-46	BINDING HEAD TAPTITE SCREW		
	E	1H		N89-3008-45	BINDING HEAD TAPTITE SCREW		
	F	2F		N89-3008-46	BINDING HEAD TAPTITE SCREW		
	G	1F		N89-4008-45	BINDING HEAD TAPTITE SCREW		
	H	1G,2H		N30-3006-46	PAN HEAD MACHINE SCREW		
	DP-7050 (FRANCE MADE)						
	601	1F	*	A01-1765-01	METALLIC CABINET		
	602	1E		A09-0078-08	BATTERY COVER		
	603	3F	*	A22-1600-11	SUB PANEL		S
	604	3F	*	A29-0338-14	PANEL ASSY(TRAY)		
	605	3F	*	A29-0339-03	PANEL(TRAY)		
	606	3F	*	A60-0318-12	PANEL ASSY(FRONT)		
	608	1E	*	A70-0921-05	REMOTE CONTROLLER ASSY		
	615	3E	*	B10-1948-03	FRONT GLASS		
	616	2E,3F	*	B12-0219-04	INDICATOR		
	617	3E		B43-0287-04	KENWOOD BADGE		
	-			B46-0122-23	WARRANTY CARD	E	
	-			B46-0143-13	WARRANTY CARD	T	
	-		*	B58-0945-03	CAUTION CARD	T	
	-		*	B60-1038-00	INSTRUCTION MANUAL(ENGLISH)		S
	-		*	B60-1040-00	INSTRUCTION MANUAL(F,G,D,I)	E	S
	-		*	B60-1041-00	INSTRUCTION MANUAL(SPANISH)	E	S
⚠	624	1H		E30-0459-05	AC POWER CORD	E	
⚠	624	1H	*	E30-2718-05	AC POWER CORD	T	
	625	1E		E30-0505-05	AUDIO CORD		
	626	1E		E30-0977-05	CORD WITH PLUG(SYSTEM CONTROL)		
	627	2H		E35-0303-05	WIRING HARNESS		
	628	2F		E35-0304-05	WIRING HARNESS		
	639	2G	*	G10-0183-04	NON-WOVEN FABRIC		
	640	2E	*	G10-0185-04	NON-WOVEN FABRIC		
	-		*	H10-5480-02	POLYSTYRENE FOAMED FIXTURE(L)	E	F
	-		*	H10-5481-02	POLYSTYRENE FOAMED FIXTURE(R)	E	F
	-		*	H10-5482-02	POLYSTYRENE FOAMED FIXTURE(L)	T	F
	-		*	H10-5483-02	POLYSTYRENE FOAMED FIXTURE(R)	T	F
	-			H25-0232-04	PROTECTION BAG (235X350X0.03)	E	
	-			H25-0361-04	PROTECTION BAG	E	
	-			H25-0651-04	PROTECTION BAG (0232 PRINTED)	T	
	-			H25-0666-04	PROTECTION BAG (0361 PRINTED)	T	
	-		*	H50-0622-04	ITEM CARTON CASE	E	F
	-		*	H50-0623-04	ITEM CARTON CASE	T	F
	645	3G,3H		J02-1072-05	FOOT		
	646	2G,2H		J11-0163-05	WIRE CLAMPER		
	647	1G,2H		J19-3300-05	UNIT HOLDER		
	648	1G,2H		J19-3325-05	UNIT HOLDER		
	649	3F	*	J19-3563-13	HOLDER		
⚠	651	1H		J42-0078-05	POWER CORD BUSHING		
	-			J61-0088-05	WIRE BAND		

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656	2F		K29-4031-04	KN@B(@UTPUT LEVEL)		
⚠ 660	2G		L07-0419-05	P@WER TRANSF@RMER		
A	2E		N09-1445-05	SET SCREW (M3X8)		
B	2G		N09-1515-05	TAPPING SCREW (3X8)		
C	2G		N29-0268-05	PUSH RIVET		
D	3F		N89-2605-46	BINDING HEAD TAPTITE SCREW		
E	1H		N89-3008-45	BINDING HEAD TAPTITE SCREW		
F	2F		N89-3008-46	BINDING HEAD TAPTITE SCREW		
G	1F		N89-4008-45	BINDING HEAD TAPTITE SCREW		
H	1G,2H		N30-3006-46	PAN HEAD MACHINE SCREW		
MECHANISM ELECTRIC UNIT (X25-4150-21)						
WH1	2B,2D		E31-7866-05	WIRING HARNESS		
S1	2B,2D		S33-2062-05	LEVER SWITCH(@PEN/CL@SE)		
DISPLAY UNIT (S MADE : X25-5142-70, F MADE : X25-5312-70)						
D1 -4			B30-1291-05	LED		
D9		*	B30-1263-15	LED		
D10			B30-1290-05	LED		
C1 ,2			CF92FV1H103J	MF 0.010UF J		
C3			C91-0769-05	CERAMIC 0.01UF K		
C4			CF92FV1H104J	MF 0.10UF J		
C5			CF92FV1H103J	MF 0.010UF J		
C200			CK45FB1H471K	CERAMIC 470PF K		
C201			CK45FF1H103Z	CERAMIC 0.010UF Z		
C202,203			CE04LW1H4R7MCC	ELECTR@ 4.7UF 50WV		
C204			CE04LW1C330MCC	ELECTR@ 33UF 16WV		
C205,206			CE04LW1H0R1MCC	ELECTR@ 0.1UF 50WV		
C207			CF92FV1H101K	MF 100PF K		
C208			CE04LW1C330MCC	ELECTR@ 33UF 16WV		
C209			CF92FV1H101K	MF 100PF K		
C210			CF92FV1H104J	MF 0.10UF J		
C211,212			CE04LW1C101MCC	ELECTR@ 100UF 16WV		
C213			CF92FV1H104J	MF 0.10UF J		
C214			CF92FV1H103J	MF 0.010UF J		
C215			CE04LW1V100MCC	ELECTR@ 10UF 35WV		
C216			CF92FV1H103J	MF 0.010UF J		
C217			CE04HW1H2R2M	NP-ELEC 2.2UF 50WV		
C218			CE04LW1C330MCC	ELECTR@ 33UF 16WV		
C219			C90-1826-05	BACKUP 0.047F 5.5WV		
C220			CK45FF1H103Z	CERAMIC 0.010UF Z		
C221,222			CF92FV1H101K	MF 100PF K		
J201	2F		E11-0199-05	PH@NE JACK(PH@NES)		
R214,215			RN14BK2C1000F	RN 100.0 F 1/6W		
VR201	2F		R29-4022-05	P@TENTI@METER 50K(@UTPUT LEV.)		
S1 -14	1E,1F		S40-1064-05	TACT SWITCH		
S21 -29	2E,2F		S40-1064-05	TACT SWITCH		
D5 -8			HSS104A	DI@DE		
D5 -8			1SS131	DI@DE		
D11 -29			HSS104A	DI@DE		
D11 -29			1SS131	DI@DE		
D30 ,31			HSS104	DI@DE		

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D30 ,31			1SS133	DIODE		
D201-208			HSS104	DIODE		
D201-208			1SS133	DIODE		
D211,212			S5688B	DIODE		
D211,212			1SR139-100	DIODE		
ED1	1E		CF1097C	INDICATOR TUBE		
IC1			TC74HC174AP	IC(D-TYPE FLIP FLOP)		
IC107			TC74HC74AP	IC(DUAL D-TYPE FLIP FLOP)		
IC201,202			NJM4565L	IC(OP AMP X2)		
Q1 -8			2SC1740S(Q,R)	TRANSISTOR		
Q1 -8			2SC2785(F,E)	TRANSISTOR		
Q9			DTC124ES	DIGITAL TRANSISTOR		
Q9			UN4212	DIGITAL TRANSISTOR		
A1	1E		W02-1129-05	ELECTRIC CIRCUIT MODULE		
CD PLAYER UNIT (S MADE : X32-240, F MADE : X32-250)						
C1 ,2			CF92FV1H102J	MF 1000PF J		
C3 ,4			CF92FV1H471J	MF 470PF J		
C5			CF92FV1H104J	MF 0.10UF J		
C7 ,8		*	C90-3491-05	ELECTRO 3300UF 35WV		
C9			CE04LW1H010MCC	ELECTRO 1.0UF 50WV		
C10			CE04LW1C330MCC	ELECTRO 33UF 16WV		
C11 ,12		*	CE04LW1C331MCC	ELECTRO 330UF 16WV		
C13 ,14			C90-1922-05	ELECTRO 47UF 25WV		
C15 ,16			CF92FV1H102J	MF 1000PF J		
C17 ,18			CF92FV1H103J	MF 0.010UF J		
C19 ,20			CF92FV1H222J	MF 2200PF J		
C23 ,24			CF92FV1H121K	MF 120PF K		
C25			CF92FV1H104J	MF 0.10UF J		
C31 ,32			CF92FV1H821J	MF 820PF J		
C34 ,35			CE04LW1V470MCC	ELECTRO 47UF 35WV		
C37			CF92FV1H103J	MF 0.010UF J		
C38 ,39			CE04LW1C470MCC	ELECTRO 47UF 16WV		
C40			CF92FV1H103J	MF 0.010UF J		
C41 ,42			CF92FV1H121K	MF 120PF K		
C43 -46			CE04LW1A221MCC	ELECTRO 220UF 10WV		
C49			CE04LW1C330MCC	ELECTRO 33UF 16WV		
C51			CF92FV1H103J	MF 0.010UF J		
C52			CE04LW1A221MCC	ELECTRO 220UF 10WV		
C55			CF92FV1H102J	MF 1000PF J		
C56		*	C91-1468-05	FILM 33PF K		
C57			CK45FF1H103Z	CERAMIC 0.010UF Z		
C58			C91-1474-05	FILM 100PF J		
C59			C91-1469-05	FILM 39PF K		
C60			CF92FV1H474J	MF 0.47UF J		
C61			CF92FV1H104J	MF 0.10UF J		
C62			CE04LW1C470MCC	ELECTRO 47UF 16WV		
C63			CK45FF1H103Z	CERAMIC 0.010UF Z		
C66 ,67			CF92FV1H103J	MF 0.010UF J		
C69			CF92FV1H473J	MF 0.047UF J		
C70			CF92FV1H152J	MF 1500PF J		
C71			CE04LW1A221MCC	ELECTRO 220UF 10WV		
C76			CE04LW1C330MCC	ELECTRO 33UF 16WV		
C77			CF92FV1H103J	MF 0.010UF J		
C78			CE04LW1C330MCC	ELECTRO 33UF 16WV		

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C79			CF92FV1H474J	MF	0.47UF	J		
C81			CF92FV1H103J	MF	0.010UF	J		
C82			CE04LW1A221MCC	ELECTRO	220UF	10WV		
C83			CF92FV1H221K	MF	220PF	K		
C86			CF92FV1H474J	MF	0.47UF	J		
C87 ,88			CF92FV1H104J	MF	0.10UF	J		
C89 ,90			CF92FV1H103J	MF	0.010UF	J		
C92			CE04LW1H010MCC	ELECTRO	1.0UF	50WV		
C93 ,94			CF92FV1H103J	MF	0.010UF	J		
C95			CE04LW1H010MCC	ELECTRO	1.0UF	50WV		
C99			CK45FF1H103Z	CERAMIC	0.010UF	Z		
C101,102		*	C90-1983-05	ELECTRO	4700UF	25WV		
C103			CE04LW1H470MCC	ELECTRO	47UF	50WV		
C104-106			CF92FV1H103J	MF	0.010UF	J		
C107,108			CE04LW1C330MCC	ELECTRO	33UF	16WV		
C109,110			CE04LW1A221MCC	ELECTRO	220UF	10WV		
C111,112			CE04LW1C330MCC	ELECTRO	33UF	16WV		
C113			CE04LW1A101MCC	ELECTRO	100UF	10WV		
C114			CE04LW1H010MCC	ELECTRO	1.0UF	50WV		
C115,116			CE04LW1C330MCC	ELECTRO	33UF	16WV	EMX	
C115,116			CF92FV1H334J	MF	0.33UF	J	T	
C117			CE04LW1A101MCC	ELECTRO	100UF	10WV		
C118			CC45FSL1H560J	CERAMIC	56PF	J		
C119			CE04LW1C330MCC	ELECTRO	33UF	16WV		
C120,121			CC45FSL1H150J	CERAMIC	15PF	J		
C122			CF92FV1H103J	MF	0.010UF	J		
C123,124			CE04LW1C101MCC	ELECTRO	100UF	16WV		
C127			CE04LW1C330MCC	ELECTRO	33UF	16WV		
C128,129			CF92FV1H103J	MF	0.010UF	J		
C130			CE04HW1A220M	NP-ELEC	22UF	10WV		
C131			CF92FV1H334J	MF	0.33UF	J		
C132,133			CF92FV1H121K	MF	120PF	K		
C134			CF92FV1H333J	MF	0.033UF	J		
C135			CE04LW1V100MCC	ELECTRO	10UF	35WV		
C136			CF92FV1H333J	MF	0.033UF	J		
C137			CF92FV1H121K	MF	120PF	K		
C138			CE04HW1H010M	NP-ELEC	1.0UF	50WV		
C139			CF92FV1H104J	MF	0.10UF	J		
C140			CE04HW1HR33M	NP-ELEC	0.33UF	50WV		
C141			CC45FSL1H470J	CERAMIC	47PF	J		
C142			CF92FV1H332J	MF	3300PF	J		
C143			CF92FV1H102J	MF	1000PF	J		
C144			CF92FV1H103J	MF	0.010UF	J		
C145			CF92FV1H104J	MF	0.10UF	J		
C146			CF92FV1H333J	MF	0.033UF	J		
C147			CF92FV1H103J	MF	0.010UF	J		
C148			CF92FV1H474J	MF	0.47UF	J		
C149			CF92FV1H152J	MF	1500PF	J		
C150			CF92FV1H222J	MF	2200PF	J		
C151			CF92FV1H121K	MF	120PF	K		
C152			CE04HW1H2R2M	NP-ELEC	2.2UF	50WV		
C153			CF92FV1H103J	MF	0.010UF	J		
C154			CE04LW1C330MCC	ELECTRO	33UF	16WV		
C155			C90-1826-05	BACKUP	0.047F	5.5WV		
C156-159			CF92FV1H103J	MF	0.010UF	J		

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C160,161			CF92FV1H102J	MF 1000PF J		
C162			CF92FV1H103J	MF 0.010UF J		
C163-165			CF92FV1H473J	MF 0.047UF J		
C166			CF92FV1H103J	MF 0.010UF J		
C167			CF92FV1H391K	MF 390PF K		
C168			CC45FSL1H820J	CERAMIC 82PF J		
C169			CF92FV1H101K	MF 100PF K		
C170			CE04LW1H010MCC	ELECTRO 1.0UF 50WV		
C171			CF92FV1H473J	MF 0.047UF J		
C172			CF92FV1H104J	MF 0.10UF J		
C174			CF92FV1H104J	MF 0.10UF J		
C175			CE04LW1A221MCC	ELECTRO 220UF 10WV		
C176			CE04LW1C470MCC	ELECTRO 47UF 16WV		
C177			CE04LW0J331MCC	ELECTRO 330UF 6.3WV	EX	
C178			CE04LW1A221MCC	ELECTRO 220UF 10WV		
C179,180			CE04LW1C470MCC	ELECTRO 47UF 16WV		
C181-184			CF92FV1H331K	MF 330PF K		
C185,186			CE04LW1C330MCC	ELECTRO 33UF 16WV		
C187-192			CF92FV1H104J	MF 0.10UF J		
C195,196			CF92FV1H105J	MF 1.0UF J		
C197			CF92FV1H104J	MF 0.10UF J		
C199			CE04LW1C330MCC	ELECTRO 33UF 16WV		
C200			CF92FV1H103J	MF 0.010UF J		
C201		×	CE04LW1C470MCC	ELECTRO 47UF 16WV		
C202			CE04LW0J331MCC	ELECTRO 330UF 6.3WV	EX	
C203			CF92FV1H102J	MF 1000PF J		
C205			CF92FV1H224J	MF 0.22UF J		
C206,207			CC45FSL1H390J	CERAMIC 39PF J		
C208			CE04LW1H010MCC	ELECTRO 1.0UF 50WV		
C209,210			CF92FV1H104J	MF 0.10UF J		
⚠ C301,302			C91-1439-05	FILM 0.01UF 250VAC		
C303-306			CE04LW1E221MCC	ELECTRO 220UF 25WV		
J1	1H		E63-0002-05	PHONO JACK(LINE OUTPUT)		
J101	1G		E11-0188-05	MINIATURE PHONE JACK(S.CONTROL		
L1 -5			L92-0018-05	FERRITE CORE		
L6			L40-1011-17	SMALL FIXED INDUCTOR(100UH,K)		
L7			L40-2291-17	SMALL FIXED INDUCTOR(2.2UH)		
⚠ L9 -11			L40-1001-17	SMALL FIXED INDUCTOR(10UH,K)		
L301			L79-0733-05	LINE FILTER		
X1			L77-1164-05	CRYSTAL RESONATOR(16.9344MHz)		
X3			L78-0267-05	RESONATOR (4.194MHZ)		
R3 -5			RN14BK2C5601F	RN 5.60K F 1/6W		
R6 ,7			RN14BK2C1501F	RN 1.50K F 1/6W		
R13 -16			RN14BK2C91R0F	RN 91.0 F 1/6W		
R17 ,18			RN14BK2C2201F	RN 2.20K F 1/6W		
R19 ,20			RN14BK2C1101F	RN 1.10K F 1/6W		
R21 ,22			RN14BK2C2201F	RN 2.20K F 1/6W		
R25 ,26			RN14BK2C1003F	RN 100K F 1/6W		
R27 ,28			RN14BK2C1001F	RN 1.00K F 1/6W		
R31 ,32			RN14BK2C1102F	RN 11.0K F 1/6W		
R33 ,34			RN14BK2C4701F	RN 4.70K F 1/6W		
R35 ,36			RN14BK2C1000F	RN 100.0 F 1/6W		
R37 ,38			RN14BK2C4701F	RN 4.70K F 1/6W		

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R39 ,40			RN14BK2C1001F	RN 1.00K F 1/6W		
R41 ,42			RN14BK2C1302F	RN 13.0K F 1/6W		
R43 -46			RN14BK2C1002F	RN 10.0K F 1/6W		
R47 ,48			RN14BK2C1302F	RN 13.0K F 1/6W		
R49 ,50			RN14BK2C1102F	RN 11.0K F 1/6W		
R54 ,55			RN14BK2C2000F	RN 200.0 F 1/6W		
R56			RN14BK2C1001F	RN 1.00K F 1/6W		
R57			RN14BK2C2002F	RN 20.0K F 1/6W		
R65			RN14BK2C1002F	RN 10.0K F 1/6W		
R67			RN14BK2C1002F	RN 10.0K F 1/6W		
R68			RN14BK2C3301F	RN 3.30K F 1/6W		
R69			RN14BK2C6801F	RN 6.80K F 1/6W		
R81 ,82			RN14BK2C1000F	RN 100.0 F 1/6W		
R83			RN14BK2C1001F	RN 1.00K F 1/6W		
R86			RN14BK2C1002F	RN 10.0K F 1/6W		
R87 ,88			RN14BK2C1000F	RN 100.0 F 1/6W		
R89			RN14BK2C1001F	RN 1.00K F 1/6W		
R90			RN14BK2C1002F	RN 10.0K F 1/6W		
R91 ,92			RN14BK2C1000F	RN 100.0 F 1/6W		
R93			RN14BK2C1002F	RN 10.0K F 1/6W		
R100			RN14BK2C1003F	RN 100K F 1/6W		
R101,102			RN14BK2C1000F	RN 100.0 F 1/6W		
R108			RN14BK2C1003F	RN 100K F 1/6W		
R119			RN14BK2C1000F	RN 100.0 F 1/6W		
R120			RN14BK2C1001F	RN 1.00K F 1/6W		
R126		*	RD14NB2E150J	RD 15 J 1/4W		
R130			RN14BK2C10R0F	RN 10.0 F 1/6W		
R170			RN14BK2C1002F	RN 10.0K F 1/6W		
R171			RN14BK2C1003F	RN 100K F 1/6W		
R194,195			RN14BK2C2701F	RN 2.70K F 1/6W		
R201			RN14BK2C2701F	RN 2.70K F 1/6W		
R202			RN14BK2C2001F	RN 2.00K F 1/6W		
R206,207			RN14BK2C1001F	RN 1.00K F 1/6W		
R225,226			RN14BK2C1000F	RN 100.0 F 1/6W		
R229-232			RN14BK2C1000F	RN 100.0 F 1/6W		
R237,238			RN14BK2C5600F	RN 560.0 F 1/6W		
R239-242			RN14BK2C3301F	RN 3.30K F 1/6W		
R243,244			RN14BK2C1501F	RN 1.50K F 1/6W		
R247,248		*	RD14NB2E150J	RD 15 J 1/4W		
R260			RN14BK2C2200F	RN 220.0 F 1/6W		
VR101-103			R12-3685-05	TRIMMING POT 10K<F.T.GAIN>		
VR104			R12-3686-05	TRIMMING POT 22K<TE BAL>		
⚠ S2	1G		S31-2131-05	SLIDE SWITCH (POWER TYPE)	M	
D1 -4			S5688B	DIODE		
D1 -4			1SR139-100	DIODE		
D5			HZS24N(B2)	ZENER DIODE		
D5			RD24ES(B2)	ZENER DIODE		
D6			HSS104	DIODE		
D6			1SS133	DIODE		
D7			HZS13N(B2)	ZENER DIODE		
D7			RD13ES(B2)	ZENER DIODE		
D8 ,9			SD103A	DIODE		
D10 ,11			E-202	CONSTANT CURRENT DIODE		

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D12			HZS15N(B2)	ZENER DIODE		
D12			RD15ES(B2)	ZENER DIODE		
D13			HZS5.1S(B2)	ZENER DIODE		
D13			RD5.1JS(B2)	ZENER DIODE		
D14			RD4.7JS(B2)	ZENER DIODE		
D15			HZS5.1S(B2)	ZENER DIODE		
D15			RD5.1JS(B2)	ZENER DIODE		
D16			SD103A	DIODE		
D17 ,18			E-352	CONSTANT CURRENT DIODE		
D19			HZS5.1S(B2)	ZENER DIODE		
D19			RD5.1JS(B2)	ZENER DIODE		
D20			HZS7.5S(B)	ZENER DIODE		
D20			RD7.5JS(B)	ZENER DIODE		
D22 -25			RD4.7JS(B2)	ZENER DIODE		
D26			HZS5.1S(B2)	ZENER DIODE		
D26			RD5.1JS(B2)	ZENER DIODE		
D27 ,28			HSS104	DIODE		
D27 ,28			1SS133	DIODE		
D101			S5688B	DIODE		
D101			1SR139-100	DIODE		
⚠ D102			1B4B41	DIODE		
D103			HSS104	DIODE		
D103			1SS133	DIODE		
D104,105			HZS13N(B2)	ZENER DIODE		
D104,105			RD13ES(B2)	ZENER DIODE		
D106,107			HZS7.5S(B)	ZENER DIODE		
D106,107			RD7.5JS(B)	ZENER DIODE		
D108			HSS104	DIODE		
D108			1SS133	DIODE		
D110-112			HZS5.1S(B2)	ZENER DIODE		
D110-112			RD5.1JS(B2)	ZENER DIODE		
D113			HZS7.5S(B)	ZENER DIODE		
D113			RD7.5JS(B)	ZENER DIODE		
D114			HSS104	DIODE		
D114			1SS133	DIODE		
D125			HZS3.9N(B2)	ZENER DIODE		
D125			RD3.9ES(B2)	ZENER DIODE		
D131-136			HSS104	DIODE		
D131-136			1SS133	DIODE		
D139,140			HSS104	DIODE		
D139,140			1SS133	DIODE		
D142			HZS3.9N(B2)	ZENER DIODE		
D142			RD3.9ES(B2)	ZENER DIODE		
D143			HZS6.2N(B2)	ZENER DIODE		
D143			RD6.2ES(B2)	ZENER DIODE		
D144,145			HSS104	DIODE		
D144,145			1SS133	DIODE		
D301-304			S5688B	DIODE		
D301-304			1SR139-100	DIODE		
D305-307			HSS104	DIODE		
D305-307			1SS133	DIODE		
IC1			NJM4558D	IC(OP AMP X2)		
IC2 ,3			NJM4565L	IC(OP AMP X2)		
IC4			TDA1547	IC(DAC)		
IC5			NJM4558L	IC(OP AMP X2)		

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IC6			SAA7350	IC(DAC)		
IC7			SM5840CP	IC(DIGITAL FILTER)		
IC8			NJM4558L	IC(OP AMP X2)		
IC9			CXD2500BQ	IC(DIGITAL SIGNAL PROCESSOR)		
IC11			NJM4558D	IC(OP AMP X2)		
IC101			NJM4558D	IC(OP AMP X2)		
IC102		*	UPD75216ACW-W35	IC(MICROPROCESSOR)		
IC103			CXD1095Q	IC(I/O EXPANDER)		
IC104			CXA1571S	IC(CD RF AMP)		
IC105			CXA1372Q	IC(CD RF SERVO)		
IC106			LC3518BSL-15	IC(16K SRAM SLOW)		
IC108,109			TA8409S	IC(MOTOR CONTROL)		
IC110			LA6510	IC(DUAL POWER OP AMP)		
IC110			TA8410AK	IC(POWER OP AMP)		
IC111			BA10393N	IC(DUAL COMPARATOR)		
IC112			LA6510	IC(DUAL POWER OP AMP)		
IC112			TA8410AK	IC(POWER OP AMP)		
IC114			TC74HCU04AP	IC(CMOS INVERTER)		
Q1 ,2			2SD1944(J,K)	TRANSISTOR		
Q3 -6			2SC2878(B)	TRANSISTOR		
Q7			2SK246(Y,GR)	FET		
Q8 ,9			2SC2878(B)	TRANSISTOR		
Q10 ,11			2SK161(GR)	FET		
Q13			DTC124ES	DIGITAL TRANSISTOR		
Q13			UN4212	DIGITAL TRANSISTOR		
Q14			2SA992(F,E)	TRANSISTOR		
Q15			2SC1845(F,E)	TRANSISTOR		
Q16			2SC3944(R,S)	TRANSISTOR		
Q17			DTC124ES	DIGITAL TRANSISTOR		
Q17			UN4212	DIGITAL TRANSISTOR		
Q18			DTA124ES	DIGITAL TRANSISTOR		
Q18			UN4112	DIGITAL TRANSISTOR		
Q19			2SK246(Y,GR)	FET		
Q20			DTC124ES	DIGITAL TRANSISTOR		
Q20			UN4212	DIGITAL TRANSISTOR		
Q22			2SK246(Y,GR)	FET		
Q23			2SK163(L,M)	FET		
Q24			2SB1370	TRANSISTOR		
Q24			2SB1375	TRANSISTOR		
Q24			2SB1548	TRANSISTOR		
Q25			2SD2012	TRANSISTOR		
Q25			2SD2061	TRANSISTOR		
Q25			2SD2374	TRANSISTOR		
Q26			2SC3944(R,S)	TRANSISTOR		
Q27			2SC1740S(Q,R)	TRANSISTOR		
Q27			2SC2785(F,E)	TRANSISTOR		
Q31 -38			2SC1845(F,E)	TRANSISTOR		
Q40			DTC124ES	DIGITAL TRANSISTOR		
Q40			UN4212	DIGITAL TRANSISTOR		
Q41 ,42			2SA992(F,E)	TRANSISTOR		
Q43 ,44			2SC1845(F,E)	TRANSISTOR		
Q45 ,46			2SA992(F,E)	TRANSISTOR		
Q47 ,48			2SK246(Y,GR)	FET		
Q101			2SC3246(H,J)	TRANSISTOR		
Q102			2SC3940A(R,S)	TRANSISTOR		

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Q103			2SB1370	TRANSISTOR		
Q103			2SB1375	TRANSISTOR		
Q103			2SB1548	TRANSISTOR		
Q104			2SC1740S(Q,R)	TRANSISTOR		
Q104			2SC2785(F,E)	TRANSISTOR		
Q105			2SD2012	TRANSISTOR		
Q105			2SD2061	TRANSISTOR		
Q105			2SD2374	TRANSISTOR		
Q106			2SA1175(F,E)	TRANSISTOR		
Q106			2SA933S(Q,R)	TRANSISTOR		
Q107			2SA1534A	TRANSISTOR		
Q108			2SA1175(F,E)	TRANSISTOR		
Q108			2SA933S(Q,R)	TRANSISTOR		
Q109			2SC3311A(Q,R)	TRANSISTOR		
Q110			2SA1309A(Q,R)	TRANSISTOR		
Q111			DTA124ES	DIGITAL TRANSISTOR		
Q111			UN4112	DIGITAL TRANSISTOR		
Q112			DTC124ES	DIGITAL TRANSISTOR		
Q112			UN4212	DIGITAL TRANSISTOR		
Q115			DTC124ES	DIGITAL TRANSISTOR		
Q115			UN4212	DIGITAL TRANSISTOR		
Q116			2SA1110(R,S)	TRANSISTOR		
Q118			2SC1740S(Q,R)	TRANSISTOR		
Q118			2SC2785(F,E)	TRANSISTOR		
Q119			DTC124ES	DIGITAL TRANSISTOR		
Q119			UN4212	DIGITAL TRANSISTOR		
Q120			2SC3940A(R,S)	TRANSISTOR		
A1			W02-1036-05	TRANSMITTING ASSY		
MECHANISM ASSY (SINGAPORE MADE : X92-1600-51)						
101	2B	*	A10-2798-32	CHASSIS ASSY		S
103	3B		A11-0695-15	SUB CHASSIS(FRAME)		
104	1B		A11-0723-03	SUB CHASSIS(CLAMP)		S
109	1B		D10-2479-03	SLIDER		
110	2A		D10-2481-04	ARM ASSY		
111	2B		D10-2489-04	ROD(SLIDER)		
112	2B		D10-2490-04	ROD(PICK UP)		
113	1A		D10-2491-04	ROD(RETAINER)		
114	2A		D13-0744-04	GEAR		
115	1A		D13-0779-04	GEAR(PULLEY)		
116	2B		D13-0780-04	GEAR(INTERMEDIATE)		
117	1A		D13-0890-04	GEAR(IDLER)		
118	1A		D13-0891-03	GEAR(MAIN)		
119	2A		D13-0892-04	GEAR		
120	3B		D13-0894-05	GEAR(FEED MOTOR)		
121	2B		D13-0895-05	GEAR(INTERMEDIATE)		
122	3B		D13-0896-05	GEAR(FEED)		
125	2B		D14-0324-04	ROLLER		
126	2B		D14-0325-04	ROLLER ASSY		
127	2B		D15-0295-04	MOTOR PULLEY(LOADING MOTOR)		
128	1B		D16-0309-03	BELT		S
130	2A		D23-0267-03	RETAINER		
135	1B		E23-0343-04	TERMINAL		
136	2B	*	E35-0322-15	WIRING HARNESS(8P)(RED/BLACK)		

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137	2B	*	E31-7236-05	WIRING HARNESS(8P)		
138	2B		E31-7868-15	WIRING HARNESS(5P)		S
140	1A		F19-1027-04	BLIND PLATE		
145	3B		G01-3326-14	COMPRESSION SPRING(FRONT)		S
146	3B		G01-3327-14	COMPRESSION SPRING(REAR)		S
147	1A,2A		G11-2038-04	CUSHION		S
148	2A		G16-0766-04	SHEET		S
152	3B		J02-1058-15	INSULATOR		
153	1B		J11-0173-23	CLAMPER		
154	3B		J19-3335-05	BRACKET		
155	2A	*	J99-0088-13	TRAY ASSY		S
156	2A	*	J99-0089-01	TRAY		S
159	1B		N19-1292-04	FLAT WASHER		
160	1A,1B		N19-0366-04	FLAT WASHER		
A			N09-2769-05	MACHINE SCREW		
B			N35-2605-46	BINDING HEAD MACHINE SCREW		
C			N39-2025-46	PAN HEAD MACHIN SCREW		
D			N89-2008-46	BINDING HEAD TAPTITE SCREW		
E			N86-2606-46	BINDING HEAD TAPTITE SCREW		
F			N09-2644-05	STEPPED SCREW		
G			N82-2608-45	BINDIG HEAD TAPTITE SCREW		
H			N89-2605-45	BINDING HEAD TAPTITE SCREW		
165	3A		S33-1022-05	LEVER SWITCH(LIMIT)		
170	1B		T50-1046-04	YOKE		
171	1B		T99-0222-05	MAGNET		
DM	3B		T42-0531-05	DC MOTOR(DISC MOTOR)		
FM	3B		T42-0532-05	DC MOTOR(FEED MOTOR)		
LM	2B		T42-0530-05	DC MOTOR(LOADING MOTOR)		
PU	2B		T25-0011-05	OPTICAL PICKUP HEAD(KSS-210A)		
MECHANISM ASSY (FRANCE MADE : X92-1590-51)						
201	2D	*	A10-2797-22	CHASSIS ASSY		S
203	3D		A11-0695-15	SUB CHASSIS(FRAME)		
204	1D		A11-0723-03	SUB CHASSIS(CLAMP)		S
209	1D		D10-2479-03	SLIDER		
210	2C		D10-2481-04	ARM ASSY		
211	2D		D10-2489-04	ROD(SLIDER)		
212	2D		D10-2490-04	ROD(PICK UP)		
213	1C		D10-2491-04	ROD(RETAINER)		
214	2C		D13-0744-04	GEAR		
215	1C		D13-0779-04	GEAR(PULLEY)		
216	2D		D13-0780-04	GEAR(INTERMEDIATE)		
217	1C		D13-0890-04	GEAR(IDLER)		
218	1C		D13-0891-03	GEAR(MAIN)		
219	2C		D13-0892-04	GEAR		
220	3D		D13-0894-05	GEAR(FEED MOTOR)		
221	2D		D13-0895-05	GEAR(INTERMEDIATE)		
222	3D		D13-0896-05	GEAR(FEED)		
225	2D		D14-0324-04	ROLLER		
226	2D		D14-0325-04	ROLLER ASSY		
227	2D		D15-0295-04	MOTOR PULLEY(LOADING MOTOR)		
228	1D		D16-0309-03	BELT		S
230	2C		D23-0267-03	RETAINER		

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235	1D		E23-0343-04	TERMINAL		
236	2D	*	E35-0322-15	WIRING HARNESS(8P,RED/BLACK)		
237	2D	*	E31-7236-05	WIRING HARNESS(8P)		
238	2D		E31-7868-15	WIRING HARNESS(5P)		S
240	1C		F19-1027-04	BLIND PLATE		S
245	3D		G01-3326-14	COMPRESSION SPRING(FRONT)		S
246	3D		G01-3327-14	COMPRESSION SPRING(REAR)		S
247	1C,2C		G11-2038-04	CUSHION		S
248	2C		G16-0741-04	SHEET		
252	3D		J02-1058-15	INSULATOR		
253	1D		J11-0173-23	CLAMPER		
254	3D		J19-3335-05	BRACKET		
255	2C		J99-0087-01	TRAY		S
256	2C		J99-0090-23	TRAY ASSY		S
259	1D		N19-1292-04	FLAT WASHER		
260	1C,1D		N19-0366-04	FLAT WASHER		
A			N09-2769-05	MACHINE SCREW		
B			N35-2605-46	BINDING HEAD MACHINE SCREW		
C			N39-2025-46	PAN HEAD MACHIN SCREW		
D			N89-2008-46	BINDING HEAD TAPTITE SCREW		
E			N86-2606-46	BINDING HEAD TAPTITE SCREW		
F			N09-2644-05	STEPPED SCREW		
G			N82-2608-45	BINDIG HEAD TAPTITE SCREW		
H			N89-2605-45	BINDING HEAD TAPTITE SCREW		
265	3C		S33-1022-05	LEVER SWITCH(LIMIT)		
270	1D		T50-1046-04	YOKE		
271	1D		T99-0222-05	MAGNET		
DM	3D		T42-0531-05	DC MOTOR(DISC MOTOR)		
FM	3D		T42-0532-05	DC MOTOR(FEED MOTOR)		
LM	2D		T42-0530-05	DC MOTOR(LOADING MOTOR)		
PU	2D		T25-0011-05	OPTICAL PICKUP HEAD(KSS-210A)		

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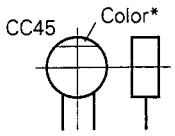
PARTS LIST

CAPACITORS

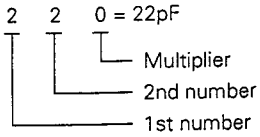
CC 45 TH 1H 220 J
1 2 3 4 5 6

1 = Type ... ceramic, electrolytic, etc.
2 = Shape ... round, square, ect.
3 = Temp. coefficient
4 = Voltage rating
5 = Value
6 = Tolerance



• Capacitor value

010 = 1pF
100 = 10pF
101 = 100pF
102 = 1000pF = 0.001μF
103 = 0.01μF



• Temperature coefficient

1st Word	C	L	P	R	S	T	U
Color*	Black	Red	Orange	Yellow	Green	Blue	Violet
ppm/°C	0	–80	–150	–220	–330	–470	–750

2nd Word	G	H	J	K	L
ppm/°C	±30	±60	±120	±250	±500

Example : CC45TH = –470 ± 60ppm/°C

• Tolerance (More than 10pF)

Code	C	D	G	J	K	M	X	Z	P	No code
(%)	±0.25	±0.5	±2	±5	±10	±20	+40 –20	+80 –20	+100 –0	More than 10μF – 10 ~ +50 Less than 4.7μF –10 ~ +75

(Less than 10pF)

Code	B	C	D	F	G
(pF)	±0.1	±0.25	±0.5	±1	±2

• Voltage rating

1st word \ 2nd word	A	B	C	D	E	F	G	H	J	K	V
0	1.0	1.25	1.6	2.0	2.5	3.15	4.0	5.0	6.3	8.0	–
1	10	12.5	16	20	25	31.5	40	50	63	80	35
2	100	125	160	200	250	315	400	500	630	800	–
3	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	–

• Chip capacitors

(EX) C C 7 3 F S L 1 H 0 0 0 J
1 2 3 4 5 6 7
(Chip) (CH, RH, UJ, SL)

(EX) C K 7 3 F F 1 H 0 0 0 Z
1 2 3 4 5 6 7
(Chip) (B, F)

Refer to the table above.
1 = Type
2 = Shape
3 = Dimension
4 = Temp. coefficient
5 = Voltage rating
6 = Value
7 = Tolerance

Dimension (Chip capacitors)

Dimension code	L	W	T
Empty	5.6 ± 0.5	5.0 ± 0.5	Less than 2.0
A	4.5 ± 0.5	3.2 ± 0.4	Less than 2.0
B	4.5 ± 0.5	2.0 ± 0.3	Less than 2.0
C	4.5 ± 0.5	1.25 ± 0.2	Less than 1.25
D	3.2 ± 0.4	2.5 ± 0.3	Less than 1.5
E	3.2 ± 0.2	1.6 ± 0.2	Less than 1.25
F	2.0 ± 0.3	1.25 ± 0.2	Less than 1.25
G	1.6 ± 0.2	0.8 ± 0.2	Less than 1.0

RESISTORS

• Chip resistor (Carbon)

(EX) R K 7 3 E B 2 B 0 0 0 J
1 2 3 4 5 6 7
(Chip) (B,F)

Dimension (Chip resistor)

Dimension code	L	W	T
E	3.2 ± 0.2	1.6 ± 0.2	1.0
F	2.0 ± 0.3	1.25 ± 0.2	1.0
G	1.6±0.2	0.8±0.2	0.5±0.1

• Carbon resistor (Normal type)

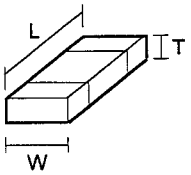
(EX) R D 1 4 B B 2 C 0 0 0 J
1 2 3 4 5 6 7

1 = Type
2 = Shape
3 = Dimension
4 = Temp. coefficient
5 = Rating wattage
6 = Value
7 = Tolerance

Rating wattage

Code	Wattage	Code	Wattage	Code	Wattage
1J	1/16W	2C	1/6W	3A	1W
2A	1/10W	2E	1/4W	3D	2W
2B	1/8W	2H	1/2W		

Dimension



DP-7050

SPECIFICATIONS

Format

System ..... Compact disc digital audio system
Laser ..... Semiconductor laser
Number of channels ..... 2 channels
Playing rotation ..... 200rpm~500rpm (CLV)

D/A Convertors

D/A conversion ..... Twin 1Bit
Oversampling 8fs (352.8kHz)

Audio

Frequency response ..... 4Hz~20kHz, ± 0.5dB (EIAJ)
Signal to noise ratio ..... More than 105dB (EIAJ)
Dynamic range ..... More than 100dB (EIAJ)
Total harmonic distortion ..... Less than 0.001%
Channel separation ..... More than 100dB (EIAJ)

Wow & flutter ..... Unmeasurable Limit
Output level/impedance
Fixed 2V/0.4kΩ
Variable ..... 0V~2V/1.1kΩ
Digital output
Optical ...–15dBm~–21dBm (Wave length 660nm)
Headphone output 20mW (16Ω)

General

Power consumption 20W
Dimensions ..... W : 440mm (17-5/16")
H : 127mm (5")
D : 318mm (12-1/2")
Weight (Net) 6.8kg (15.0lb)

Note : KENWOOD follows a policy of continuous advancements in development. For this reason specifications may be changed without notice.

Note :
Component and circuitry are subject to modification to insure best operation under differing local conditions. This manual is based on, the Europe (E) standard, and provides information on regional circuit modification through use of alternate schematic diagrams, and information on regional component variations through use of parts list.

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